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STEEL

FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

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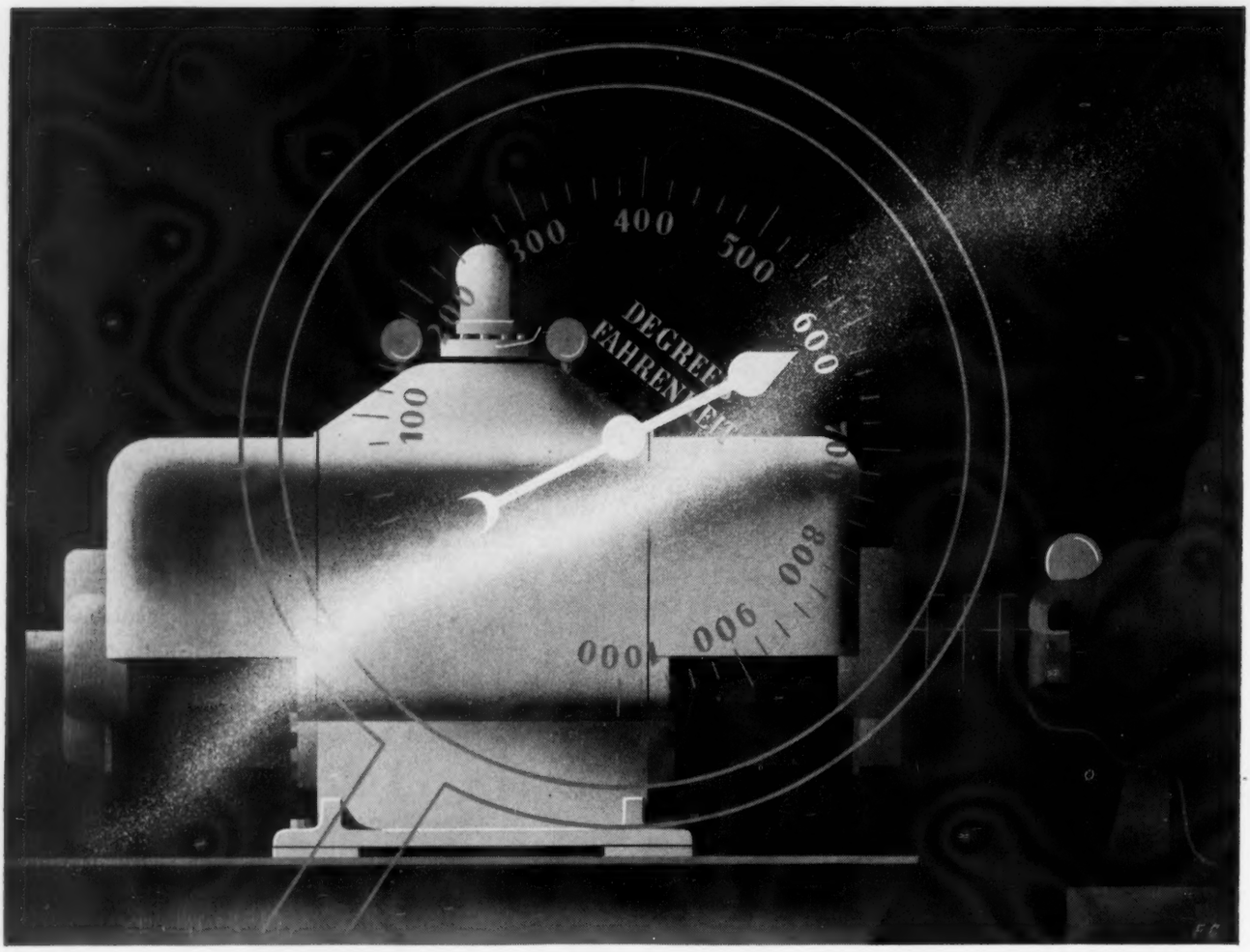
PRODUCTION · PROCESSING · DISTRIBUTION · USE



BETTER MATERIALS FOR HIGHER TEMPERATURES

NEW developments bring new problems. The designing of an improved direct-drive steam engine, for oil-field service, necessitated the use of a material that would withstand continuous subjection to high steam temperature (550° to 600°F.).

The manufacturer adopted a Chrome-Nickel-Moly (0.50—1.00% Mo) iron for vital engine parts. Due to its Moly and Chromium contents, its low growth resistance assures maintenance of the close tolerances necessary to efficient engine performance.

This iron also has advantages from the standpoint of production costs. The castings are free from defects. They have fine grain in the heavy sections and satisfactory machinability in the light sections.

On the foregoing points alone, Moly irons warrant careful consideration. And there are many others, likewise attested in practice. Our book, ***"Molybdenum in Cast Iron,"*** will show the way to more economical high-strength castings. It is free. Climax Molybdenum Co., 500 Fifth Ave., New York.

PRODUCERS OF FERRO-MOLYBDENUM, CALCIUM MOLYBDATE AND MOLYBDENUM TRIOXIDE

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STEEL
PRODUCTION • PROCESSING • DISTRIBUTION • USE

As the Editor Views the News

■ IMPETUS continues to gather behind the movement toward better industrial relations. At Washington, a senate subcommittee continues to take testimony from industrial leaders as to the value of an incentive taxation system aimed at stabilization of employment; opinions as to the value of such a system (p. 33) differ. A research into the effect of machines on employment and the standard of living has been launched (p. 35) by the American Society of Tool Engineers. Hailing the social security act as a great advance, it affords only a limited degree of protection, says Edward R. Stettinius, chairman, United States Steel Corp.; he holds (p. 24) that it leaves ample scope for "socially-minded employers to provide added protection adjusted to varying family needs."

. . .

Unemployment compensation benefits will be available by January (p. 23) in forty-six states, the district of Columbia, Hawaii and Alaska. Certain weaknesses in the system have been exposed and simplification is needed in the interest of effectiveness. . . .

"Security" In 46 States

A number of manufacturers say the minimum steel wage recommended by the public contracts board (p. 25) would eliminate them as government suppliers and ask that it be reconsidered. . . . Many distinctive features will highlight the Golden Gate international exposition (p. 30) now taking form at San Francisco. Included are hangars with three-hinged arch design, in anticipation of gigantic airplanes of the future. Steel requirements of the exposition run into many thousands of tons.

. . .

Demand for steel (p. 79) has leveled off. Steel production last week dropped another point (p. 27) to 61 per cent of ingot capacity. Recovery in the United States is lagging (p. 35) behind that of five other major countries. Optimism continues to prevail in the automobile industry based on the fact that actual sales of new cars to consumers are considerably above the rate of a year ago. The current rate of production (p. 38) is expected to be maintained at least into February. . . . Much progress has been made in earmarking our industrial facilities for the production of war materials (p. 33) and an extensive allocation system has been worked out. An unusual recent order (p. 31) calls for 65,800 steel windows for a single community housing project.

Recovery in U. S. Lags

. . .

Mass production of dams for the government has brought about the development (p. 49) of a well-defined series of operations for handling and placing 200-ton spillway gates. . . .

Advanced Practices

Advanced practices and controls at a modern axle plant (p. 50) result in the production of precision forgings that approach rough-turned parts in accuracy. . . . A Canadian steelmaker derives operating advantages through automatic control of an open-hearth furnace through instrumentation. Some of these instruments (p. 54) indicate, record, or integrate, while others mainly control. . . . Phosphate treatment of metallic wearing surfaces recently has been applied as a method of increasing wear resistance. A piston ring manufacturer (p. 60) uses this treatment with gratifying results.

. . .

An ingenious method is used at one foundry (p. 66) to reduce inherent dust hazards. A man walks through the plant each day with a large salt shaker containing a powder that has a highly offensive odor. He sprinkles some of this material at points where the good housekeeping code is violated. . . .

Reduce Dust Hazard

Die castings again are used extensively (p. 46) in 1939 automobiles, in grilles, headlamp bezels, louvers, instrument panel parts and general hardware. . . . Gearmotor drives have won wide application in recent years. One manufacturer (p. 64) reveals important savings through using such drives on draw benches for producing seamless tubing. . . . A specially equipped electric crane facilitates pickling of refrigerator parts (p. 58) prior to porcelain enameling.

E. L. Shaner

Inland Research Scores Again

Ledloy—Another Metallurgical Achievement that Is Saving Money for Steel Users

Again, the pioneering of Inland metallurgical research has, in effect, put money into steel users' pockets.

The recently announced development of INLAND LEDLOY has enabled metal working plants to speed up their machining operations 30% to 60%. In terms of dollars, savings like the following examples are typical:

In the making of a case carburized worm shaft, $47.85 machining cost is being saved per ton of steel used.

The manufacturer of a socket ball control joint is saving $37.91 per ton by using Inland Ledloy 1120 instead of ordinary SAE 1120.

Finding ways of making better steel for each customer's purpose is the basis for Inland personal service. The occasional development of a new kind of steel, such as Inland Ledloy or Inland Hi-Steel (high tensile), merely emphasizes the extensive modern laboratory facilities which Inland makes daily available to all steel users.

Often but a small change in the surface characteristics of a steel sheet, or special control over its physical properties, makes a big difference in the costs and results of a forming operation; or the suggestions of an Inland engineer may help to save time and material in the use of structural steel.

More companies today than ever before are utilizing these special services to supplement their own technical staffs. We believe you would find this a worth-while practice to follow.

INLAND STEEL CO.

38 South Dearborn Street, CHICAGO • District Offices: DETROIT • KANSAS CITY • MILWAUKEE • ST. LOUIS • ST. PAUL

SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

Unemployment Insurance Blankets U. S.

In January; Billion Dollars Collected

■ UNEMPLOYMENT compensation benefits will be available by January in 46 states, the District of Columbia, Hawaii and Alaska. Every state and territory has enacted jobless insurance laws, covering about 25,500,000 industrial and commercial workers.

These laws provide for benefit payments for limited periods during unemployment, are fairly uniform; 80 per cent provide for some form of merit rating system which eventually will reduce the amount of taxes required by employers with favorable employment records.

By August, 1938, benefits were being paid by 28 states, in amounts which to Sept. 1 totaled $263,157,000. August benefit payments were $47,400,000.

Taxes to support the program have been in effect since 1936. Cumulative collections and interest totaled $888,964,000 as of Aug. 31.

Reason for unemployment compensation enactments for all states was the federal social security act, signed Aug. 14, 1935. The federal law provided for an excise tax on payrolls of employers of eight or more (with certain occupations exempted) and provided for federal grants to states passing compulsory unemployment compensation laws meeting requirements of the federal social security board. The federal tax was 1 per cent in 1936; 2 per cent in 1937; 3 per cent in 1938 "and thereafter."

Employers in states having unemployment compensation laws were allowed to deduct up to 90 per cent of the federal tax to apply on state unemployment compensation taxes. If the state had no unemployment compensation law, employers paid the full amount of the federal tax, but none was returned to the state for payment of unemployment benefits.

State Laws Fairly Uniform

Every state fell in line by enacting laws patterned after suggested drafts prepared by the social security board. The result is fairly uniform state laws, although these differ somewhat in the amount of taxation provision for merit rating, benefit payments to unemployed and other details.

In the three years since the federal social security act was passed and during which the various state laws were enacted, certain weaknesses have been exposed.

Most important: Disappointment to unemployed persons by delay in benefit payments and uncertainty as to the amount and duration of payments. Benefit provisions in state laws already tested have been so involved, and record-keeping so complicated, that payments have been delayed for weeks and months, even to persons unquestionably eligible.

States have demanded from employers a mass of detail and a maze of reports, far beyond what will ever be used for benefit payments or preventing future unemployment.

Details of wages and hours have been asked for each employe, for each pay period, and sometimes even subdivided by places of employment and types of work. Although requirements for information from employers differ in the various states, the states generally have collected millions of figures that never will be used.

To correct some of these weak-

✦

Master of Granite

■ More than a million cubic yards of broken granite boulders have been removed from the site of Grand Coulee dam and pumping plant, putting steel equipment to the toughest test. In the development of the Lake Superior iron mines, stripping a million cubic yards of soft earth from an ore deposit was considered a major job. Rock work at Grand Coulee includes driving 12 tunnels, each about 17 feet diameter, diagonally upward through the canyon wall for pipes through which water will be pumped for irrigation. Generators will develop 2,700,000 horsepower of electrical energy. NEA photo

nesses, Frank B. Cliffe, assistant comptroller, General Electric Co., recently suggested three improvements in state laws:

Benefits should be based on employe's actual wages instead of his hypothetical "full-time wages" as provided in practically all state laws.

Reliable employers should be relieved of preparing detailed reports for each employe. They should be allowed to furnish data only for employes who have been separated from their payroll, or who have applied for benefit payments.

Merit rating formulae should be simplified as to administrative requirements.

Comments Mr. Cliffe: "If these voluminous reports were merely an expense and burden to employers, it would be bad enough, but their very bulk is responsible for much of the delay and errors in paying benefits."

Security Board Recognizes Defects

Cognizance of the program's defects was taken by the social security board last summer when it started a survey to determine how unemployment compensation could be simplified and made more effective.

Ohio's law is regarded as fairly typical of the majority of state enactments. It has what is known as the "pooled-fund system" under which all contributions collected by the state go into a single fund, from which benefits are paid to eligible employes, disregarding their former employers (except for merit rating records). This system has been adopted by 44 states.

Wisconsin by contrast has an "employer-reserve system." Contributions under this system are not pooled, but each employer's contribution is credited to his own account, and benefits are paid from his account only to his former employes.

Ohio's act, like many other state laws, has reduced the number of employes necessary to bring an employer under the act. In Ohio the tax applies to employers of three or more.

Consider a typical case under the Ohio act—that of Mr. Small Manufacturer, whose annual payroll totals $100,000.

How much tax he must pay pending establishment of his merit rating is shown in this table:

Taxable Payroll of $100,000	Net Federal Tax Rate Per Cent	Ohio Contribution Rate Per Cent	Net Federal Tax	Ohio Contribution
1936	0.1	.9	$100	$ 900
1937	0.2	1.8	200	1800
1938	0.3	2.7	300	2700
1939	0.3	2.7	300	2700
1940	0.3	2.7	300	2700
1941	0.3	2.7	300	2700
1942 and thereafter	0.3	?	300	?

What his Ohio contribution rate and amount will be in 1942 and thereafter depends on the merit rating earned by his employment experience. For each manufacturer a separate account will be maintained and his account will be credited with all tax payments. Benefit payments to his former employes will be charged against his account.

If Mr. Small Manufacturer had no benefit payments charged against his account through 1941, his account would show a total of $13,500, or 13.5 per cent of his annual payroll.

How would this affect his tax rate under the merit rating system?

The Ohio act provides the following rates:

Employer's Excess Per Cent Annual Payroll	Ohio Tax Rate Per Cent Payroll
15 or more	1.0
12 to 15	1.5
10 to 12	2.0
8 to 10	2.5
Less than 8	3.0
No Excess	4.0

Beginning in 1942, Mr. Small Manufacturer would be taxed 1.5 per cent of his annual payroll to meet state requirements. When his account shows $15,000 in reserve, or 15 per cent of his annual payroll, his tax rate will drop to 1 per cent.

If, however, benefit payments to former employes reduce his reserve to 8 per cent of annual payroll, his tax rate will be 3 per cent, and if benefit payments equal or exceed his tax contributions, his rate will be 4 per cent.

Stated object of the merit rating system is to stabilize employment by encouraging employers to provide regular full-time employment. New tax rates will be established for each employer once a year.

Most states have incorporated some variation of this merit rating system. Examples:

Alabama's system is based on the individual employer's actual experience. After 1941 tax rates may range from 1.5 to 4 per cent of total annual payroll.

Connecticut provides, starting in 1940, that employers whose excess of tax payments over benefits is more than 7.5 per cent but less than 10 per cent of annual payroll will be taxed 2.5 per cent of total annual payroll. If excess is 10 to 12.5 per cent, tax rate will be 2 per cent; if excess is 12.5 to 15 per cent, tax will be 1.5 per cent; if excess is 15 to 17.5 per cent, tax rate will be 1 per cent; if excess is 17.5 per cent, tax will be waived.

Illinois' merit rating system becomes effective in 1942 and provides employers be classified according to actual experience. If excess of tax payments over benefits to former employes is 7.5 to 10 per cent, tax rate will be 1.8 per cent; if excess is 10 to 12.5 per cent, tax rate will be 0.9 per cent; if excess is 12.5 per cent, contributions cease.

Massachusetts' act provides the commissioner shall classify employers to reduce rate to equitably reflect their experience by 1941.

Michigan's merit system becomes effective April 1, 1942, and provides the following rates: If excess is less than 8 per cent, tax rate will be 3 per cent; excess between 8 and 10 per cent, tax rate 2.5 per cent; excess 10 to 12 per cent, tax rate 2 per cent; excess 12 to 15 per cent, tax rate 1.5 per cent; excess over 15 per cent, tax rate 1 per cent.

New York has no definite provisions for merit rating. State advisory council is directed to study act's operation on basis of actual contribution and benefit experience and to report on practicability of establishing a rating system.

Pennsylvania has no provisions for reductions.

Average payment for total unemployment in the states now paying benefits is $10.90 a week, according to a report of the social security board for July. Payments ranged from $7.44 in Tennessee to $12.65 in Utah. Payments for partial unemployment averaged $5.72, and ranged from $4.57 in Wisconsin to $7.23 in Utah.

STETTINIUS CITES FACTORS IN ECONOMIC SECURITY

Approving social insurance in principle, Edward R. Stettinius, chairman, United States Steel Corp., last week told the Association of Life Insurance Presidents at New York that it does not provide complete protection. The primary purpose, he pointed out, is not independence but subsistence.

"Without passing on the details of the social security act, and although aware that its machinery may need readjusting," said Mr. Stettinius, "I am convinced that recognition of the principle of social security by the enactment of that legislation represents a great advance—one deeply desired by the people and deserving to be protected by all who cherish the well-being of our social order. . .

"Moreover, because the benefits provided afford only a limited degree of protection, there is ample scope for thrifty individuals and so-

(*Please turn to Page* 97)

Public Contracts Wage Minimum; Smaller Manufacturers State Case

WASHINGTON

■ RECONSIDERATION of its minimum steel wage recommendation under the Walsh-Healey act is urged on the public contracts board by a number of manufacturers doing business with the government.

Inquiries disclosed that up to last Saturday the board had received letters from Apollo Steel Co., Apollo, Pa., and Continental Steel Corp., Kokomo, Ind., as heretofore reported in STEEL; Reeves Steel & Mfg. Co., Dover, O.; Colorado Fuel & Iron Corp., Denver; Sloss Sheffield Steel & Iron Co., Birmingham; and a brief from Rob't. H. Irons, president, Central Iron & Steel Co., Harrisburg, Pa.

However, it is believed more protests will be filed before expiration of the time limit set by the board, Dec. 10. Many eastern companies, as well as small companies in the Middle West, feel they have been practically ruled out of government business by the proposed 62½ cents an hour minimum for northern manufacturers.

One of the board's main purposes in carrying out the provisions of the Walsh-Healey act presumably was to establish a "floor" for wages, not force increases for those in the higher brackets. Yet this is what it is expected to lead to, as in many instances wages paid to skilled and semiskilled workers are determined or influenced by the base rate.

Companies also want the board to consider geographical differentials, relative living costs, and the fact that not being integrated establishments they must purchase their materials in the open market.

Typical Company's Attitude

Typical of the attitude of many smaller companies in eastern Pennsylvania is this brief from Mr. Irons:

"The recent virtual elimination of differentials between basing points in combination with the drastic reduction in steel prices, makes it extremely difficult to see how these prices can be maintained without wage reduction.

"Our plant is nonintegrated and in competition with large plants which are completely integrated. We manufacture one product only, steel plates, whereas the large integrated plants manufacture a full line of steel products. Because of our nonintegration we are compelled to pay heavy freight rates on all our raw materials.

"Raw materials which bulk largest in our costs are iron and steel scrap, and because of our location on the eastern seaboard the prices are very sensitive to the exporting of scrap, which is done in large volume, and which keeps the domestic prices at a high level.

"Again due to our location on the eastern seaboard, we are compelled to compete at a great disadvantage with imported steel plates. This competition is a negligible factor in the business of the steel plants located in the Pittsburgh and Chicago districts.

"We have only one plant, located in Harrisburg. This city is the center of two railroad systems . . . has large railroad shops and yards and many varied manufacturing industries. The common labor rate at our plant is considerably higher than the similar prevailing wage paid in other industries in this locality, including those paid by the railroads.

"The entire wage structure of our plant is based on the basic or common labor rate. Any increase in this basic rate would automatically bring about corresponding increases in all other hourly, piece-work and tonnage rates. In other words, our entire wage structure would be changed to our serious detriment.

"It is an historical fact that a wage differential has always existed throughout industry between this district and Pittsburgh and Chicago. This wage differential was recognized in the case of the NRA codes by the department of labor when . . . it divided the country into a number of districts and based them on the then existing wages in the steel industry.

Points to NRA Differentials

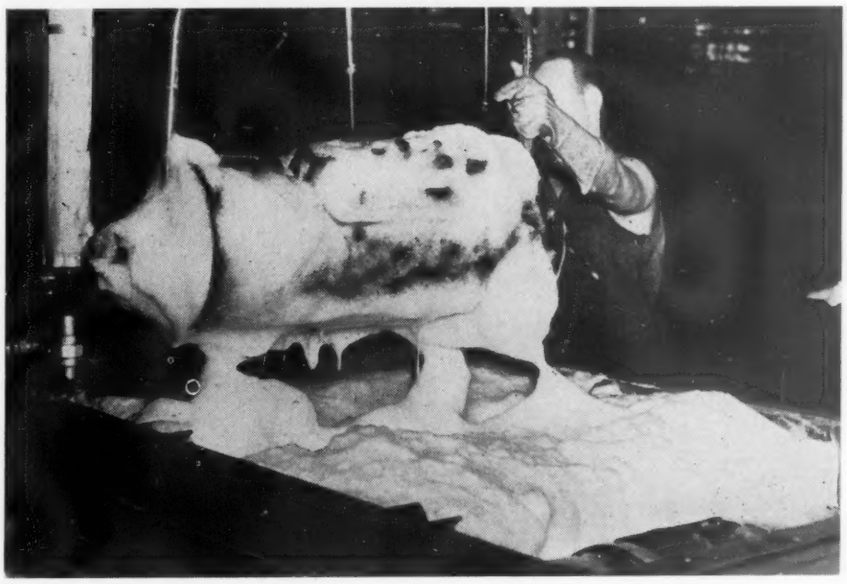
"The differentials in basic wages established then by the NRA code were substantially the same differentials as exist today between the various districts . . . There also historically existed in this district a differential between the basic or common labor rates paid by large integrated plants, and those paid by the small nonintegrated plants. This differential also exists today.

"Our plant is located in a relatively small community surrounded by small towns and farms. The majority of our men live in these small towns and on the farms and their living conditions are less arduous and on a considerably lower cost basis than in . . . congested Pittsburgh and Chicago districts.

"We submit that your honorable board should conclude that any elimination of prevailing wage differentials . . . would have a serious and disastrous effect upon both the wage structure and the competitive ability of our company in executing contracts for the United States government. Our government contracts for the United States navy constitute from 10 per cent to 20 per cent of our output and we are very eager to continue to serve the government in this respect."

In its letter to the board, Reeves Steel & Mfg. Co. urges further study of the smaller manufacturers' position. It states its common labor rate is 53½ cents an hour; that it purchases semifinished steel from larger producers, "and unless proper

Giving Small Steel Parts a Shampoo



■ **At General Motors' new Ternstedt plant, Trenton, N. J., small items of automobile hardware are tumbled with hardened steel balls in a drum, then dipped repeatedly into a mixture of cleaning fluid, soap and water, preparatory to plating**

consideration is given the smaller companies like ours . . . we and others will be automatically forced out of the picture so far as government business is concerned."

Colorado Fuel & Iron says its present labor base at its Pueblo plant is 60 cents, and "while an increase of 2½ cents per hour may appear on its face to be comparatively small, nevertheless, it involves a large percentage of protesting employes and will require an adjustment of many, if not most of its other rates in order that the differentials in these rates heretofore and customarily prevailing be maintained."

Sloss Sheffield asks the board to eliminate commercial pig iron business in the Birmingham district from the iron-steel classification. Also, to "find the prevailing minimum wage in this locality in the commercial pig iron business to be 40 cents per hour, or to find and fix in accordance with fact, prevailing minimum wage in the Birmingham district, in the industry, to be 40 cents per hour, not 45 cents."

The company also points out in considerable detail what it considers errors of fact regarding southern steel wages.

LABOR

STEEL EMPLOYMENT UP FOR THIRD CONSECUTIVE MONTH

■ EMPLOYMENT in the steel industry advanced for the third consecutive month in October, according to the American Iron and Steel institute. A total of 436,000 workers were employed, 5000 more than in September.

Payrolls amounted to $56,176,000, largest since November, 1937. In September they were $52,365,000. In October a year ago $76,191,000 was disbursed to 587,000.

Hourly wage earnings averaged 83.2 cents in October, compared with 83 cents in September and 82.5 cents in October, 1937.

Wage earners worked an average of 31.2 hours a week in October; 30.0 in September; 29.4 hours in August; 24.2 in July. In October, 1937, the average was 31.9.

MET. TRADES EMPLOYMENT STEADY IN OCTOBER

Metal trades employment in October was substantially the same as for September, showing a decline of only 0.1 per cent, according to the National Metal Trades association, Chicago. The index is based on reports from members in 22 cities. October figures indicated employment was 78.1 per cent of the 1925-1927 monthly average.

AVIATION

DETROIT COMPANY FORMED TO MAKE AIRCRAFT PARTS

■ CHANDLER-EVANS CORP., Detroit, has been organized with capital of $200,000 to manufacture aircraft accessories and parts. A large interest is held by National Aviation Corp.

Production is to begin immediately on a nonicing carburetor and diesel fuel pumps, according to Charles W. Deeds, president. Mr. Deeds formerly was general manager of Pratt & Whitney division, United Aircraft Corp.

LOCKHEED AWARDED THREE LARGE FOREIGN CONTRACTS

Substantial orders placed by three foreign countries with Lockheed Aircraft Corp., Burbank, Calif., has increased the company's backlog to $29,900,000.

Included is one for $320,000 from Polish Air Lines for four twin-engine transport planes. Others: 50 bombers for the Australian air board; three high-speed transports for the air ministry of France, to go into Europe-Africa service.

AIR SERVICES PLACE ORDERS FOR MILITARY PLANES, PARTS

United States navy air corps has awarded a $754,000 contract for 20 general utility amphibians to Grumman Aircraft Engineering Corp., Bethpage, N. Y.

Other air service orders placed recently include: For war department, to Kollsman Instrument Co. Inc., Elmhurst, N. Y., altimeter assemblies, $135,850; Walter Kidde & Co., New York, oxygen cylinders, $125,984; Sperry Gyroscope Co., New York, indicator assemblies, $376,600; Eclipse Aviation Corp., East Orange, N. J., starters, $33,800.

For navy department, to Hamilton Standard Propellers, East Hartford, Conn., propellers, $45,000; Pratt & Whitney, East Hartford, Conn., engine bearing assemblies, $48,650.

Malleable Founders Will Convene in Cleveland

■ Malleable Founders' society will conduct its semiannual meeting at the Terminal club, Hotel Cleveland, Cleveland, Dec. 15, with a program devoted to technical aspects of production and applications of malleable and economic factors affecting the industry. The meeting will embrace a morning session, a luncheon, an afternoon session and a dinner. Robert E. Belt, 2013 Union Trust building, Cleveland, is secretary.

Promoting Castings

■ Marshall Post, president, American Foundrymen's association, has completed a tour of mid-west cities

Tom Thumb and the Diesel Giant

■ **It was 110 years ago that Baltimore & Ohio tried out Peter Cooper's Tom Thumb, first locomotive built in the United States, then only an experimental model. Last week crowds in Chicago saw it alongside B & O's new diesel-powered Capitol Limited, latest of the streamlined trains, employing modern metals the like of which Cooper in his New York Iron Works never dreamed**

during which he addressed members of the association in Detroit and Milwaukee and the Quad City chapter in Moline, Ill. Plans are under way for a publicity and advertising campaign to inform industry of recent developments in cast metals. Mr. Post's talks covered important aspects of these developments.

Mr. Post is vice president and general manager of Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

Gen. Johnson Ill; Steel Men Hear Kerensky

■ Gen. Hugh S. Johnson, former NRA administrator, was to speak before the Youngstown chamber of commerce last Thursday night, and a large number of executives associated with the iron, steel and metalworking industries arranged to attend. The general was too ill to appear, but the audience heard Alexander Kerensky, prime minister of the first Russian republic, now lecturing in this country.

Kerensky said a struggle between liberty and violence is raging throughout the world. "Liberty will win everywhere, or nowhere. The most powerful stronghold of democracy, United States, finally will be taken if it is surrounded on all sides by the enemy."

He declared Stalin, Hitler and Mussolini are "filled with the same organic hatred—hatred of liberty and hatred of democracy." He urged organized world public opinion for moral pressure to restore freedom and democracy.

World Tin Production, Consumption Decline

■ Steady decline in world production of tin is reported by International Tin Research and Development council. Average quarterly production in 1937 was 52,100 gross tons. First quarter 1938 production was 43,100 tons, second quarter 39,200 tons, third quarter 34,300 tons.

Apparent tin consumption averaged 49,700 tons per quarter in 1937 but in 1938 the first three quarters showed consumption of 41,000 tons, 40,000 tons and 34,300 tons, respectively.

Most marked decrease for nine months was shown by the three largest tin consuming countries, United States 41.6 per cent, United Kingdom 28.5 per cent, and U.S.S.R. 27.3 per cent. For the same period Germany showed an increase of 14 per cent, Japan 21.7 per cent, Italy 36.1 per cent, Poland 60.9 per cent and Sweden 63.6 per cent.

World tin plate production averaged 1.064.000 tons by quarters in 1937. In 1938 the quarters produced 743,000 tons, 730,000 tons and 688,000 tons, respectively.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Dec. 3	Change	Same week 1937	Same week 1936
Pittsburgh	47	− 3	24	72
Chicago	56.5	− 2	30	77
Eastern Pa.	37	+ 3	31	48.5
Youngstown	65	+ 4	35	78
Wheeling	62	− 4	30	92
Cleveland	72	− 5	31	79.5
Buffalo	49	− 2	21	84
Birmingham	75	None	54	74
New England	76	+ 2	32	91
Cincinnati	75	+ 5	14	96
St. Louis	51.5	+ 3	20.6	68
Detroit	84	+ 2	50	95
Average	61	− 1	30.5	76.5

Licensed To Build Superfinishing Machines

■ Due to demand from metalworking companies for new equipment to handle "superfinishing" operations, Chrysler Corp. has licensed Cincinnati Milling Machine Co., Cincinnati, and the Norton Co., Worcester, Mass., to build machines for this type of finishing. Hitherto only Foster Machine Co., Elkhart, Ind., has held a license.

Superfinishing was described in STEEL for Sept. 26, p. 36.

Granite City Adds Temper Rolling Unit

■ Granite City Steel Co., Granite City, Ill., has started installation of an annealing and temper rolling unit, costing $1,500,000 to $3,000,000. This is part of an improvement program begun in 1935, including additions to buildings and installation of two cold strip and a hot strip mill. Construction of the new unit will require about four months.

Cost of the complete expansion program will be about $5,500,000. It will enable production of sheet steel of any marketable gage and a larger output of tin plate.

Join in Metals Safety

■ National Safety council, Chicago, has announced the following have joined the council's metal section: Copperweld Steel Co., Glassport, Pa.; Hamilton Foundry & Machine Co., Hamilton, O.; Lycoming Mfg. Co., Williamsport, Pa.; Burmeister & Wain Ltd., Copenhagen, Denmark; Rustless Iron & Steel Co., Baltimore; Henry G. Thompson & Sons Co., New Haven, Conn.; United Engineering & Foundry Co., Pittsburgh; Ampco Metal Inc., Milwaukee; Burton-Dixie Corp., Chicago; Butler Bros., Chicago; Hanover Wire Cloth Co., Hanover, Pa.; F. H. Lawson Co., Cincinnati; and Wagner Mfg. Co., Sidney, O.

PRODUCTION

■ STEELWORKS operations last week increased in six centers, declined in five and remained steady in one. The national rate is estimated at 61 per cent, 1 point below the preceding week.

Youngstown, O.—Averaged 65 per cent, up 4 points, with 66 per cent expected this week. Active capacity last week included 56 open hearths, three bessemers and 14 blast furnaces. Youngstown Sheet & Tube Co. started a 10-day run on its bessemer furnace and added an open hearth. Republic also added an open hearth.

New England—Gained 2 points to 76 per cent.

Cleveland—Declined 5 points to 72 per cent, resulting from curtailment by one producer.

St. Louis—One open hearth was added and the rate advanced 3 points to 51.5 per cent.

Cincinnati—Up 5 points to 75 per cent. Backlogs indicate continued production at about this level for December.

Detroit—Increased 2 points to 84 per cent, 21 of 25 open hearths active.

Birmingham, Ala.—Held at 75 per cent, with 16 furnaces in operation. Ensley rail mill of Tennessee Coal, Iron & Railroad Co. is working with a small backlog. Coal mining by the Tennessee company has been put on full two-shift schedule.

Buffalo—Off 2 points to 49 per cent on withdrawal of one open hearth by Bethlehem Steel Co.

Pittsburgh—Down 3 points to 47 per cent following seasonal leveling of demand.

Wheeling—Reduced 4 points to 62 per cent.

Central eastern seaboard—Rose 3 points from Thanksgiving week average, to 37 per cent.

Chicago—Declined 2 points to 56.5 per cent as an important producer reduced activity.

Colorado Fuel & Iron Trusteeship Terminated

■ Trusteeship of Colorado Fuel & Iron Corp., Denver, has been terminated by order of Judge J. Foster Symes, in United States district court, Denver. This completes reorganization of the former Colorado Fuel & Iron Co., started in 1935 with Arthur Roeder as trustee.

With net loss of $1,711,542 in the calendar year 1935, first half 1936 showed net profit of $891,559, and the fiscal year ended June 30, 1937, net profit of $1,207,850. For fiscal year ended June 30, 1938, a net loss of $829,362 was reported.

Coke Decline Less Than in Iron, Steel; Over 300 Ovens Completed

■ COKE PRODUCTION in the first ten months this year has held up slightly better than pig iron and steel, but still is 43 per cent under the corresponding period last year. Pig iron output was 56 per cent below the first ten months last year; steel ingots trailed 1937 by 54 per cent.

Coke's relatively better showing is due to a fairly sustained miscellaneous demand. Merchant coke plants during the first ten months this year operated at 69.9 per cent of capacity, while furnace plants operated at only 41.3 per cent. In the corresponding period last year, merchant plants averaged 83.4 per cent, and furnace plants 83 per cent.

Output from both furnace and merchant plants rose sharply in October; operations for the month were 83.2 per cent at merchant plants, 73.4 per cent at furnace plants.

Beehive Output Down

Adequate supply of by-product coke checked the beehive coke boomlet of last year. Six per cent of 1937 production was produced in beehive ovens, compared with 3.7 per cent in 1936, 2.6 per cent in 1935 and 3 per cent in 1934. For the first ten months these beehive ovens produced only 2.8 per cent of the total.

By-product coke production in the first ten months this year was 25,155,524 net tons, compared with 43,164,700 tons in the corresponding period last year.

Beehive coke output for ten months was 716,600, against 2,860,700 tons in the period in 1937.

Coal charged into by-product ovens in the ten months totaled 35,629,132 tons, compared with 61,701,915 last year; into beehive ovens, 1,132,200 tons of coal this year, against 4,537,200 last year.

Beehive ovens have been dismantled steadily in the past three decades and in 1937 were exceeded in number by by-product ovens for the first time. In 1910, there were 100,362 beehive ovens; in 1920, 75,298; in 1929, 30,082; in 1937, only 12,194 remained.

First by-product ovens were constructed at Syracuse, N. Y., in 1893 and in that year produced 0.1 per cent of the total coke output. The World war impelled a wave of by-product oven building and the number increased from 6268 in 1915 to 10,379 in 1919. In the latter months of 1918, by-product coke production exceeded beehive oven production for the first time and since has made steady gains. Latest bureau of mines figures list 12,718 by-product ovens, of which 9299 are at furnace plants and 3419 at merchant plants.

The fact that many by-product ovens were built during or before the war, and now are 20 years or more old, has caused considerable speculation on probable replacement needs.

The efficient life of a coke oven plant cannot be accurately determined. One authority believes it to be 20 years and says that after that limit is reached the ovens have high radiation losses, are low in yield, should be replaced.

Another builder reports ovens built 25 or more years ago are still in operation. Many of these, he says, should be modernized in view of the many improvements developed since the World war.

Had it not been for the depression, much replacement building would have been accomplished. This naturally retarded replacement because of lack of funds, and because some ovens were closed and their life thereby extended.

The government's interest in the industry's by-product ovens as an integral part in the national defense program is reflected in questionnaires to coke plant operators. A by-product plant in time of emergency would be in effect a munitions plant as it can make high explosives, coke for metallurgical use, and a long list of other products important to warfare.

National defense considerations may speed modernization and replacements of the older ovens.

Ovens Built This Year

Completed during 1938 were 69 Koppers-Becker ovens for Republic Steel Corp. at Youngstown, O.; 15 Koppers-Becker ovens for American Rolling Mill Co. at Hamilton, O.; 41 Koppers-Becker ovens for Colorado Fuel & Iron Co. at Pueblo, Colo.; 59 Koppers-Becker ovens for Inland Steel Co. at Indiana Harbor, Ind.

One hundred thirty Semet-Solvay ovens were built for Great Lakes Steel Corp., and half are in operation. Carnegie-Illinois Steel Corp. will put half of their 140 new Wilputte ovens at Gary, Ind., into service by Feb. 1, and half by March 1.

Construction started this year on 61 Koppers ovens for Ford Motor Co. at Dearborn, Mich., and on a light oil plant in connection with ovens of Republic Steel Corp. at Youngstown.

Into by-product coke ovens last year was charged 69,575,373 tons of coal, valued at $260,453,698. Average yield per ton of coal charged was 70.73 per cent coke and 5.58 per cent breeze. Blast furnaces consumed 34,730,491 tons of the 49,210,748 tons of by-product coke.

By-products in 1937 included 757,628,942 thousand cubic feet of gas, 603,053,288 gallons of tar, 1,506,431,251 pounds of ammonium sulphate or its equivalent and 187,054,346 gallons of crude light oil.

Total value of coke and by-products, produced in by-product ovens was $397,925,273.

For each ton of coal charged there was recovered 10.89 thousand cubic feet of gas, 8.67 gallons of tar, 21.84 pounds of ammonium sulphate and 2.86 gallons of crude light oil.

Ups and Downs of Coke Industry

United States Production of Coke in Net Tons
By U. S. Bureau of Mines

Year	By-Product Production	Beehive Production	Total Production	% of Total Production from By-Product Ovens	Number Ovens in Existence By-Product	Beehive
1892	.....	12,010,829	12,010,829	...	....	42,002
1893	12,850	9,464,730	9,477,580	0.1	12	44,189
1894	16,500	9,187,132	9,203,632	0.2	12	44,760
1895	18,521	13,315,193	13,333,714	0.1	72	45.493
1900	1,075,727	19,457,621	20,533,348	5.2	1,085	57,399
1905	3,462,348	28,768,781	32,231,129	10.7	3,103	84,405
1910	7,138,734	34,570,076	41,708,810	17.1	4,078	100,362
1915	14,072,895	27,508,255	41,581,150	33.8	6,268	93,110
1918	25,997,580	30,480,792	56,478,372	46.0	9,279	84,635
1919	25,137,621	19,042,936	44,180,557	56.9	10,379	82,560
1920	30,833,951	20,511,092	51,345,043	60.0	10,881	75,298
1925	39,912,159	11,354,784	51,266,943	77.9	11.290	57,587
1929	53,411,826	6,472,019	59,883,845	89.2	12,649	30,082
1932	21,136,800	651,900	21,788,700	97.0	13,053	19,440
1935	34,224,053	917,208	35,141,261	97.4	12,860	13,674
1936	44,569,121	1,706,063	46,275,184	96.3	12,849	13,012
1937	49,210,748	3,164,721	52,375,469	94.0	12,718	12,194
1938*	25,155,524	716,600	25,872,124	97.2	.....	.....

*Ten months.

November Pig Iron Output Up 14.3 Per Cent as 7 More Stacks Resume

■ NOVEMBER production of coke pig iron in the United States was highest since October, 1937. With a net increase of seven stacks, blast furnace activity continues on the upgrade.

Daily average output amounted to 76,218 gross tons, a gain of 9524 tons, or 14.3 per cent, over the October rate of 66,694 tons. This was the highest daily output since October, one year ago, with 93,259 tons. Production for November, last year, averaged 66,901 tons daily.

Total production in November was 2,286,530 gross tons, an increase of 219,031 tons, or 10.6 per cent, compared with the October total of 2,067,499 tons. This was largest monthly output since October, 1937, when 2,891,026 tons was made.

Output in the first 11 months this year was 16,676,814 tons, compared with 35,205,665 tons in the corresponding period last year, a decrease of 18,528,851 tons, or 52.7 per cent. Output in the like period for 1936 was 27,557,512 tons.

MONTHLY IRON PRODUCTION

Gross Tons

	1938	1937	1936
Jan.	1,444,862	3,219,741	2,029,304
Feb.	1,306,333	3,020,006	1,838,932
March	1,470,211	3,470,470	2,046,121
April	1,388,008	3,400,636	2,409,474
May	1,260,937	3,545,180	2,659,643
June	1,060,747	3,115,302	2,596,528
July	1,213,327	3,501,359	2,595,791
Aug.	1,495,514	3,616,954	2,711,726
Sept.	1,683,097	3,417,960	2,728,257
Oct.	2,067,499	2,891,026	2,991,794
Nov.	2,286,530	2,007,031	2,949,942
Tot. 11 mo.	16,676,814	35,205,665	27,557,512
Dec.	.....	1,503,474	3,125,192
Total	.....	36,709,139	30,682,704

Relating production to capacity, operations in November averaged 55 per cent. This was the highest rate since October, 1937, when the figure was 68.4 per cent. Rate for October was 48 per cent; September, 40.5 per cent; August, 34.8 per cent. November, 1937, rate was 49.3 per cent.

During November, one merchant stack and one steelworks furnace were blown out or banked. With nine nonmerchant furnaces added the net gain of seven brought the total number to 121 in operation at end of November. This compared with 114 in October; 97 in September, and 114 in November, 1937. Low point during the year was 67 in June.

Stacks blowing in during November were: In Ohio: Campbell No. 3, Youngstown Sheet & Tube Co.; Massillon and River No. 2, Republic Steel Corp. In Pennsylvania: Cambria F, Bethlehem Steel Co.; Carrie No. 1, Carnegie-Illinois Steel Corp. In New York: Niagara A, Tonawanda Iron Corp. In Maryland: Maryland E, Bethlehem Steel Co. In Alabama: Ensley No. 6, Tennessee Coal, Iron & Railroad Co. In Indiana: Gary No. 8, Carnegie-Illinois Steel Corp.

Furnaces blowing out were: In New York: Troy, Troy Furnace Corp. In Pennsylvania: Bethlehem G, Bethlehem Steel Co.

Dismantling of the Keystone blast furnace of Reading Iron Co. at Reading, Pa., was started in November. This unit, the last of several furnaces once operated by the company, was built in 1898-99 and rebuilt in 1926, and had an annual capacity of 130,000 tons of basic, foundry, malleable and forge pig iron. It had not been in blast for several years. With removal of this stack, total number of potential furnaces in the country is reduced from 237 to 236.

RATE OF OPERATION

(Relation of Production to Capacity)

	1938[1]	1937[2]	1936[3]	1935[4]
Jan.	33.6	76.6	48.2	34.2
Feb.	33.6	79.5	46.4	41.4
March	34.2	82.5	48.5	41.0
April	33.4	83.7	59.1	40.0
May	29.4	84.3	63.1	40.2
June	25.5	76.6	63.6	37.2
July	28.2	82.9	61.5	35.2
Aug.	34.8	85.7	64.3	40.7
Sept.	40.5	83.7	66.9	42.5
Oct.	48.0	68.4	71.0	45.8
Nov.	55.0	49.3	72.3	49.5
Dec.	....	35.6	74.2	49.0

[1] Based on capacity of 50,606,400 gross tons, Dec. 31, 1937; [2] first half on capacity of 49,512,737 tons, Dec. 31, 1936—second half on capacity of 49,727,737 tons, June 30, 1937; [3] capacity of 49,777,893 tons, Dec. 31, 1935; [4] capacity of 50,845,741 tons, Dec. 31, 1934. Capacities by American Iron and Steel Institute.

NOVEMBER IRON PRODUCTION

	No. in blast last day of Nov.	Oct.	Total tonnage Mer. chant	Nonmerchant
Ohio	31	28	56,970	536,068*
Penna.	30	29	40,563*	513,452*
Alabama	16	15	109,262	125,038
Illinois	9	9	40,909	175,101
New York	9	9	27,192	127,895
Colorado	1	1		
Indiana	9	8	8,082*	352,827
Maryland	5	4		
Virginia	1	1		
Kentucky	1	1		
Mass.	0	0		
Tenn.	0	0		
Utah	1	1	10,668	162,503
West Va.	3	3		
Michigan	4	4		
Minnesota	1	1		
Missouri	0	0		
Total	121	114	293,646*	1,992,884*

*Includes ferro and spiegeleisen.

Report Rich Iron Ore Deposits in Labrador

■ Discovery in Labrador of iron ore deposits containing 60 to 70 per cent iron has been announced by Dr. J. A. Retty, chief geologist for the Labrador Mining & Exploration Co. Remoteness and extent of deposits add to cost of exploration, and the hope is expressed that the British government can be interested in developing an important ore source in its own dominions to replace Spanish and Swedish ore, now less available than formerly. Labrador belongs to Newfoundland, a British crown colony.

Highest grade ore is found at Sawyer Lake, 284 miles north of Seven Islands, Que., on the Gulf of St. Lawrence and a second deposit, of lower grade, at Attikamagen, 35 miles northwest of Sawyer Lake.

AVERAGE DAILY PRODUCTION

Gross Tons

	1938	1937	1936	1935
Jan.	46,608	103,863	65,461	47,692
Feb.	46,655	107,857	63,411	57,675
March	47,426	111,951	66,004	57,120
April	46,267	113,354	80,316	55,719
May	40,675	114,360	85,795	55,986
June	35,358	103,843	86,551	51,949
July	39,131	112,947	83,735	49,043
Aug.	48,242	116,676	87,475	56,767
Sept.	56,103	113,932	90,942	59,009
Oct.	66,694	93,259	96,509	63,818
Nov.	76,218	66,901	98,331	68,876
Dec.	.....	48,499	100,813	68,242
Ave.	49,931	100,573	83,832	57,694

An ore body at Ruth Lake, northwest of the others, has been known for some time.

"Igloo of Tomorrow" Takes 200 Tons Steel

■ Two hundred tons of steel will be required for the "Igloo of Tomorrow" to be built by Carrier Corp., Syracuse, N. Y., as an exhibit at the New York World's fair.

The igloo will be 70 feet high, sheathed with white stucco with a special crystallized finish simulating snow, will have its own private aurora borealis and an entrance of the same type used in regular snow houses. Surrounding will be pools which at night will reflect the flood lighted effect on the igloo.

The exhibit will be air conditioned with the newest apparatus which will be shown through a large glass casing.

Steel in Golden Gate Fair; New Type Hangars To Become Part of Airport

■ FINDING its incentive in the completion of two great steel masterpieces of this decade—the new bridges spanning San Francisco bay—the Golden Gate international exposition which is to open Feb. 18 will emphasize steel in dramatic exhibits and novel construction.

A number of exposition buildings on Treasure Island, in the bay, have been designed for permanence. Two hangars which with a terminal structure will form the nucleus of the new San Francisco municipal airport, represent a radical departure in construction.

Built by McDonald & Kahn at a cost of $800,000, these hangars were designed under supervision of John J. Gould, chief structural engineer for the Exposition company. Each measuring 265 x 335 feet, they will be used as exhibit buildings during the fair.

The hangars are of three-hinged arch design with concrete walls cantilevered outside the lower arch pins. Walls and roof are carried on ten three-hinged arches fabricated from 14-foot sections. The arches span 217 feet to center of pins and have a center pin height of 66 feet above the floor.

Door openings 200 feet long and 40 feet high have been provided, but due to height of the arches this opening may be increased to a height of 65 feet in center to admit transport planes with towering tail structures such as visioned for future.

With the concrete walls counterbalancing the weight of the roof, arch thrusts are reduced to a minimum, thus effecting a saving in foundations. Tension on horizontal ties is computed at 18,000 pounds, as against 74,000 pounds without cantilevering the walls.

Steel in these hangars—2100 tons—was fabricated and erected by the Judson-Pacific Co.

The third permanent building for the airport now serves as a fair administration building. This three-story, semicircular, 380 x 630-foot concrete structure required 1005 tons of reinforcing steel.

400-Foot Steel Tower Featured

Steel forms the backbone of the fair's most conspicuous feature, "Tower of the Sun." This is octagonal, outside diameter about 59 feet, height 400 feet. Weight of the structural steel, also fabricated by Judson-Pacific, is 880 tons.

The framework is covered with plaster and composition material. Installed at an elevation of 74 feet is a 5-ton bell; and at an elevation of 234 feet are 38 carillons weighing 20 tons. Surmounting the tower is a metal Phoenix, 22 feet high and weighing 5000 pounds, symbolizing the rise of San Francisco from the ashes of its disastrous fire in the year 1906.

In a $250,000 exhibit the United States Steel Corp. will tell the story of steel. One section will illustrate each step in production, from mines to finished product. A huge diorama will depict the working of an open-pit ore mine. Operation of a blast furnace, an open-hearth furnace and a rolling mill also will be portrayed.

Attendants at each of the dioramas will explain raw materials and the scientific methods steel employs in their selection; mining and transportation; details of plant equipment; control of materials; selection and training of employes to develop skill and promote safety and welfare. Displayed will be samples of raw materials, pig iron, finished steel and alloy steels.

In another section, Columbia Steel Co., United States Steel subsidiary, will exhibit various products it supplies to western markets. Steel's service to the leading western industries, including mining, fishing, lumber, oil, agriculture and shipping, will be explained.

Still another section will demonstrate methods used by the Corporation's research laboratories. One of the many interesting features to appeal to the public—though, of course, not a laboratory practice—will be a grand piano suspended on a single piano wire.

Two stainless steel piers 35 feet high, replicas of the piers of the $77,000,000 Oakland-San Francisco bay bridge, will emphasize the Corporation's part in supplying materials for this great structure. Another display is to be a diorama of San Francisco in 1999, showing how new steel products may develop the super-city of the future. The Corporation's exhibits will occupy 17,000 square feet of floor area in Hall of Mines, Metals and Machinery.

In this huge hall there will be reproductions of the West's great mining districts. "Treasure Mountain" range will be 50 feet high and extend 250 feet in length.

Outside on the mountain range, the visitor will start at the southern end of the "Mother Lode," journey through California's gold mining

■ From its 400-acre, man-made Treasure Island in San Francisco bay, in which 5000 tons of reinforcing steel was used, to the 400-foot Tower of the Sun, steel has played an important part in construction of the Golden Gate exposition, to be opened in February. Steel and other metalworking industries themselves will be represented by many exhibits

country into Montana, east into Utah and then south to the Arizona copper country. The natural topography of these districts will be reproduced in detail with foregrounds covered with material brought from the actual areas. Mine interiors likewise will be reproduced. Nearly 500 feet of underground passageways are to be constructed through the mountain, with mine equipment and miners at work.

Show Streamlined Steel House

Among the many exhibits on the grounds will be an "ultra-streamlined" five-room steel house, with four of its rooms oval in shape.

Other exhibitors in the Hall of Mines, Metals and Machinery whose names have been announced by the fair management include Chrysler Corp. and subsidiaries, E. I. du Pont de Nemours & Co. Inc., Ford Motor Co., General Cable Corp., General Electric Co., General Motors Corp. and subsidiaries, General Time Instrument Corp., International Business Machines Corp., C. W. Marwedel, representing American Swiss File & Tool Co.; Boston Gear Works Inc., Diamond Expansion Bolt Co., Eastman Mfg. Co., Imperial Brass Mfg. Co., Johnson Bronze Co., William H. Ottemiller Co., Parker-Kalon Corp., Reed Mfg. Co., Standard Pressed Steel Co., L. S. Starrett Co., N. A. Strand & Co., D. A. Stuart & Co. Ltd., J. H. Williams & Co., National Cash Register Co., Neptune Meter Co., Pacific Coast Gas association, Pacific Electric Mfg. Corp., Pacific Gas & Electric Co., Westinghouse Electric & Mfg. Co., Nevada-Massachusetts Co., Merrill Co., H. W. Gould Co., Mine & Smelter Supply Co., Tubbs Cordage Co., and American Potash & Chemical Corp.

Goulds Pumps Inc. Marks Ninetieth Anniversary

■ Goulds Pumps Inc., Seneca Falls, N. Y., celebrates its ninetieth birthday this year. Founded in 1848 by Seabury S. Gould, who made the first all-iron pump, he was succeeded as president in 1872 by his son, James H. Gould. On the latter's death in 1896 his brother, Seabury S. Gould II succeeded, and in 1908 Norman J. Gould, grandson of the founder, became president.

The company's history has spanned four wars, five panics, eight depressions and nine boom periods. It is typically American, located in a small city with home-town people for employes, son following father and grandfather. For manufacture of pumps the plant has one of the largest foundries in this country, with four cupolas in the iron division, 12 melting furnaces in the brass section.

Activities of Steel Users, Makers

■ DESIGNERS FOR INDUSTRY INC., Cleveland, has established a new products service to enable manufacturers to fill seasonal gaps and to replace old lines reaching saturation points with new products that fit into existing facilities. Market research, engineering development and invention groups are correlated.

♦

Lake Erie Engineering Corp., Buffalo, maker of hydraulic presses and special machinery, is constructing an addition to its engineering department. This will triple the present floor space for the department, and also provide more room for other departments.

♦

Meehanite Metal Corp., Pittsburgh, has licensed the following to manufacture under the Meehanite processes: Valley Iron Works, St. Paul; Barnett Foundry Machine Co., Newark, N. J.; Herbert Morris Ltd., Loughboro, England; Douglas Fraser & Sons Ltd., Arbroath, Scotland.

♦

Kuhlman Electric Co., Bay City, Mich., has purchased the Detroit Electric Furnace Co., Detroit, and will operate it as a division. The Detroit company's offices, machine shop, experimental equipment and parts stock are being moved to Bay City, and the same sales, service and production personnel will continue in the conduct of the company's business under the direction of A. E. Rhoads. Correspondence should be addressed to Bay City.

♦

Continental Can Co. Inc., New York, has acquired, through a Pennsylvania subsidiary, seven and one-half acres in Oil City, Pa., to construct a can manufacturing plant and warehouse. Production will consist primarily of refinery-sealed oil cans.

♦

Pacific works of Columbia Steel Co., San Francisco, has been merged with the company's Pittsburg works, will be known as the rope and fence department of the Pittsburg works, and will operate under the jurisdiction of William Cohn, general superintendent, Pittsburg works.

♦

Construction of a 130,000-square foot warehouse and office building for Wheeling Corrugating Co. has been started in St. Louis. A two-story office section will have four large show windows equipped with turntables for revolving displays. The Austin Co., Cleveland, is building the structure, representing an investment in excess of $300,000.

♦

Osborn Mfg. Co., Cleveland, maker of brushes and molding machines, recently purchased the assets of the Johns Conveyor Corp., Newark, N. J., and obtained the exclusive patent rights to manufacture and sell the Johns conveyor. Manufacturing operations are being moved to Cleveland and Harry S. Johns, inventor, will be chief engineer, Johns Conveyor division of the Osborn company.

Fabricating 65,800 Steel Windows, Casings

■ **Detroit Steel Products Co., Detroit, has been awarded a contract for 65,800 bonderized steel windows and casings for Metropolitan Life Insurance Co.'s $50,000,000 community housing project in the Bronx, New York. The company reports this as the "largest single order for windows in the history of residential construction." The project embraces 171 buildings, ranging from 7 to 13 stories in height. Steel Products will fabricate 2795 net tons of steel for the windows and casings, using automatic welding machines, as illustrated**

Arched-Flange Girders up to 100 TONS used on Lincoln Tunnel Approach

Ranking among largest ever built, these girders presented interesting problems in transportation and erection

HERE was a situation where non-parallel alignment, skewed abutments, grade, curves with super-elevation, and transportation were the major problems. These involved the deck plate-girder spans for the overpasses of the Lincoln Tunnel approach at Pleasant Avenue, Park Avenue and the Hudson County Boulevard East in Weehawken, N. J.

The plate girders, some of which were among the largest ever built, ranged up to 143 ft. 9 in. in length, 14 ft. 1-13/16 in. in depth and to about 100 tons in weight, were fabricated as individual units at our Ambridge plant. The final haul to the site was accomplished on truck-pulled special trailers. Erection was done by tractor cranes.

The fabrication and erection of some 3300 tons of steel for the various Weehawken approach projects again demonstrates the preparedness of American Bridge personnel and facilities to meet any structural steel requirement.

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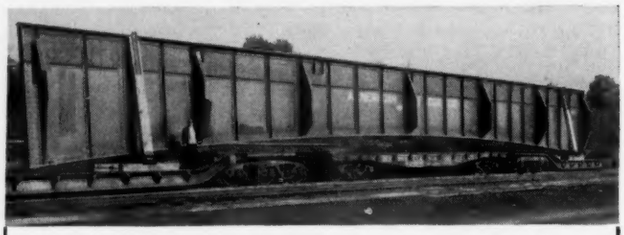
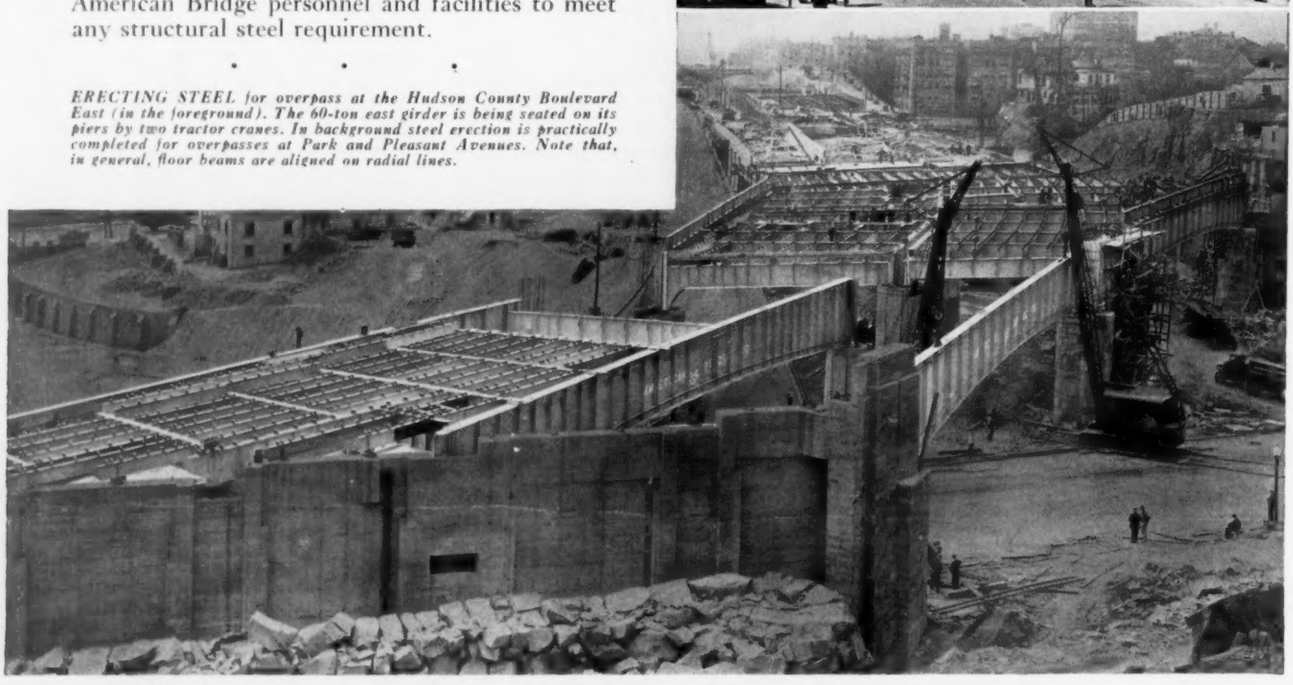


GIRDERS were transported to site in vertical position. (Above) Because of extreme girder depths, clearance through tunnels and under railroad structures was obtained by loading the arched-flange girders on well cars. (Below) A 100-ton girder negotiating a 4% highway grade. Front end is supported on an 8-wheeled goose-neck trailer hauled by three trucks. Rear is carried by a 16-wheeled special trailer hauled by two trucks.

Port of New York Authority project. George M. Brewster & Son, Gen. Contr.



ERECTING STEEL for overpass at the Hudson County Boulevard East (in the foreground). The 60-ton east girder is being seated on its piers by two tractor cranes. In background steel erection is practically completed for overpasses at Park and Pleasant Avenues. Note that, in general, floor beams are aligned on radial lines.

AMERICAN BRIDGE COMPANY

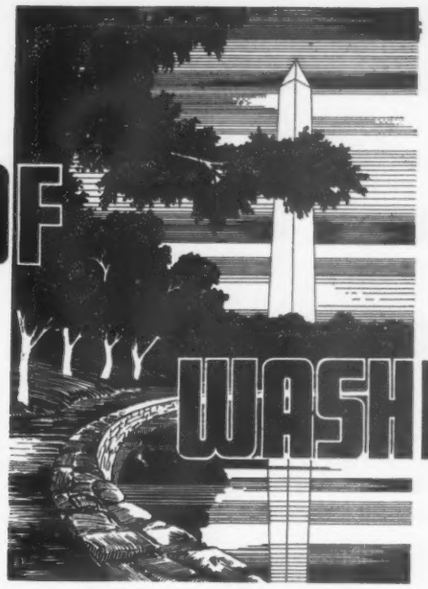
General Offices: Frick Building, Pittsburgh, Pa.

Baltimore · Boston · Chicago · Cincinnati · Cleveland · Denver · Detroit
Duluth · Minneapolis · New York · Philadelphia · St. Louis

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

WINDOWS OF WASHINGTON



WASHINGTON

■ PLANNING for wartime procurement and the mobilization of industry involves consideration of practically every phase of our national life, according to the annual report of Louis Johnson, assistant secretary of war, whose office is charged with procurement for the army.

Discussing allocation of industrial facilties:

"The allocation system provides for equitable division of the productive capacity of the country. Specific manufacturing facilities are assigned in peace time to the procuring agencies to meet their requirements in time of war.

"In matching requirements to capacities the load is uniformly distributed with due regard to productive possibilities, strategic location and civilian needs. Plans are made for conversion and for new construction where necessary. The selected plants are acquainted with the task to be accomplished through specifications, drawings and descriptions of the items to be manufactured. Actual samples are issued when appropriate. A schedule of production, accepted by the management, indicates willingness and ability to do the work.

"The past year has seen a considerable readjustment of the undertakings assigned individual manufacturers. An attempt has been made to get closer to the organization and the actual machinery that is installed in the plants in order to relate the items desired more closely to the tools that are to produce them.

"Problems in manufacture that war-time mass production may be expected to develop are disclosed in advance. Adjustments are constantly being made to fit changes in the industrial structure and to capitalize improvements in materials, processes and methods.

"Each supply arm and service has an active field procurement planning organization for the survey of industry for direct contact with the manufacturing plants on which it will depend for supplies in time of war. The field agencies report changing conditions in industry. The reports are recorded and analyzed. Data in concise and convenient form have now been placed in the hands of all service procuring agencies concerned, showing the war load by individual plants and industries.

"These directories serve to earmark plants now allocated for the munitions program and to facilitate surveying activities in the field. The contact between the war department and industry has grown closer. There has been an increasing appreciation by all concerned of the problems to be expected in the munitions program. The growing use, in military war games, of industrial data prepared by this office is considered important."

BY L. M. LAMM
Washington Editor, STEEL

TOO MUCH GOVERNMENT "INTERPRETATION" FEARED

Hearings were continued last week before the special senate profit-sharing committee.

Government must adopt some form of incentive taxation if it hopes to induce industry to stabilize employment through an annual wage, Gerard Swope, president, General Electric Co., Schenectady, N. Y., told the committee. He said he hoped profit sharing with employes was good business but "I don't know it." He testified that over the past 22 years his company has paid out $100,000,000 in shared profits to 60,000 employes.

Mr. Swope said he believes the undivided profits tax was wisely amended by congress during the last session. He testified his company had abandoned a profit-sharing plan established in 1916, under which employes with five years' service were paid an additional 5 per cent of their earnings yearly, because the plan was not geared to company profits.

Hanford MacNider, president, Northwestern States Portland Cement Co., testified he is opposed to incentive taxation and urged complete repeal of the undivided profits tax, stating that action would provide a surer incentive for business expansion. He opined this type of taxation might develop a trend among employers toward lowering wages to a minimum so that they could charge, for tax purposes, as large amount as possible toward profit-sharing.

Profit-sharing aids efficiency, lowers costs and prevents labor troubles; George T. Trundle Jr., Cleveland engineer, told the committee. He testified his company had installed 12 profit-sharing plans in various industries and all are working well. He said that he was in favor of incentive taxation.

Lammot du Pont, president, E. I. du Pont de Nemours & Co., Wilmington, Del., said he was opposed to incentive taxation to encourage profit sharing. He said he feared too much administrative "interpretation" of such tax laws and consequent bureaucratic interference with the conduct of business enterprise.

MONOPOLY PROBE STARTS; FIGURES BORE AUDIENCE

The widely advertised monopoly investigation hearings started late last week. Senator O'Mahoney, committee chairman, stated at the outset that no "personal, partisan or factional program" was contemplated.

He warned the crowd that some of the committee's hearing would prove dull but very important. By noon of the first day, half the crowd

present at the opening had departed.

"Whether this study be fruitful of benefit to society or altogether futile," said Chairman O'Mahoney, "depends largely on two factors:

"The manner in which it is conducted, and the manner in which it is received by the public."

First witness was Dr. Isador Lubin, commissioner of labor statistics. He presented charts, tables and other statistical data to show the loss in wages and salaries during the past nine subnormal business years exceeded $119,000,000,000, or 40 per cent more than the peak total national income in 1929.

Dr. Lubin said the total loss of working time resulting from unemployment that prevailed during the past nine years is equal to more than a full year's employment for every one who had a job in the nonagricultural industries in the United States in 1929.

"Our failure to maintain the past rate of advance in the standard of living is certainly not due to any lack of management ability, capital, labor or natural resources," Dr. Willard Thorpe told the committee. "There is no such simple answer," he said.

"The character of the economic structure is continually changing. Advances in technology, for example, may create new industries and destroy long-established ones.

"The initiative of business men, individually and collectively, is itself a constant creator of change, while too much inertia, on the other hand, may also cause a maladjustment.

"Some situations have sufficient public importance to warrant government intervention of one kind or another. Under forces such as those, our economic pattern has changed greatly in recent years. Both within the structure itself and in the relationship of government to industry."

Answers to questionnaires sent to trade associations in connection with the monopoly investigation are being returned slowly. To 2300 questionnaires, the department last week had received between 500 and 600 replies, expects several hundred more eventually.

While department officials are not overly enthusiastic about the percentage of replies, past experience indicates a 25 per cent return on complicated questionnaires is fair.

EXTEND TEMPORARY RATES ON BITUMINOUS COAL

Interstate commerce commission last week extended the temporary increases on bituminous coal freight rates. These rates were to have expired Dec. 31.

The National Bituminous Coal association, the Consumers' Council, the National Coal association and others had opposed continuance of the higher rates. Commissioner Joseph B. Eastman also opposed continuing the increases. Majority opinion, however, contended refusal to continue the increases to the so-called Pocahontas lines would, as a practical matter, be tantamount to a like denial to their direct competitors who would be forced to forego the benefits of higher rates in order to retain business. The Pocahontas lines include the Chesapeake & Ohio, the Norfolk & Western, and the Virginian. It is estimated by the railroads the increased revenues for 1938 would amount to more than $19,000,000.

COMPLIANCE CERTIFICATES NOT REQUIRED BY LAW

Paul Sifton, deputy wage-hour administrator, has anounced that labels and certificates of compliance on invoices are not required under the fair labor standards act.

"Many employers have inquired whether or not it was necessary to put a label on goods, or a statement on invoices, that the fair labor standards act had been complied with," Mr. Sifton said. "The act contains no requirement that goods bear any special label or that certificates of compliance must be furnished to purchasers. Nor does the act authorize the administrator to prescribe such labels or certificates by regulation.

"Such labels, or certificates of compliance, or contracts of indemnity, are purely a matter of private contract between the buyer and the seller, and they may serve a useful purpose in some cases.

"It should be made perfectly clear, however, that such a label or certificate is in no sense the official act of the administrator certifying that the requirements of the law have been met. Such labels or certificates are no guarantee to the purchaser that he will be free from prosecution or injunction for the violation of section 15-a, dealing with 'hot goods'."

LABOR STATISTICS SURVEY BREAKS DOWN PWA SPENDING

A tabulation by the bureau of labor statistics presents a 5-year analysis of PWA work and segregates money spent for various commodities.

The tabulation shows $72,200 was spent for iron and steel products per $1,000,000 for PWA residential building construction projects; for nonresidential building construction projects, $150,000 was spent per $1,000,000 for iron and steel products.

It is shown also by the bureau's tabulation that for PWA sewage disposal systems, $146,000 per $1,000,000 was spent for iron and steel products; for water supply systems, $375,800 was spent for iron and steel products per $1,000,000.

For PWA steam power and light plants, $56,600 per $1,000,000 was spent for iron and steel products; and for PWA diesel power and light plants, $35,500 per $1,000,000 was spent for iron and steel products; $122,000 per $1,000,000 was spent for iron and steel products for PWA street and road projects and for PWA reclamation projects $108,000 per $1,000,000 was spent for iron and steel products.

SPECIAL UNIT TO CHECK WAGE-HOUR VIOLATIONS

A special investigating unit has been established in the justice department to check violations of the wages and hours act.

Key man in the new unit will be Joseph A. Brill, who until recently was aide to Thomas E. Dewey, New York district attorney. Mr. Brill will be assisted by ten attorneys who have been transferred from the antitrust division.

SPRING SESSION OF TRADE FAIR IN LEIPZIG IN MARCH

Leipzig Trade Fair will hold its next spring session in Leipzig, Germany, March 5-13. It will comprise over 10,000 exhibits of the newest products of the leading producing countries, including the United States. This will be the 1981st session of the historic exchange which has been in existence more than 700 years. Leipzig Trade Fair Inc., 10 East Fortieth street, New York, is the American agent for the fair.

SIGN TRADE AGREEMENT

State department has announced a provisional commercial treaty between the United States and Greece. Agreement was effected by exchange of notes and contains general provisions for nondiscriminatory treatment in respect to tariff rates and other forms of trade control.

IRON AND STEEL AWARDS

The government announced awards on iron, steel and their products amounting to $342,953.92 for the week ended Nov. 26. These awards were made under the Walsh-Healey act, as follows: Pennsylvania Forge Corp., Philadelphia, $10,061.45; Judson Pacific Co., San Francisco, $28,158.00; General Steel Castings Corp., Eddystone, Pa., $14,910.00; Bethlehem Steel Co., Bethlehem, Pa., $99,247.44; Blaw-Knox Co., Pittsburgh, $33,072.00; Carnegie-Illinois Steel Corp., Denver, Colo., $10,081.84; Heltzel Steel Form Iron Co., Warren, O., $13.913.00; and Howard Foundry Co., Chicago, $133,510.19.

MEETINGS

SUPPLY GROUPS TO HOLD JOINT ZONE DISCUSSION

■ A SPECIAL joint zone meeting of the American Supply and Machinery Manufacturers' association and National Supply and Machinery Distributors' association will be held at the Dearborn Inn, Dearborn, Mich., Dec. 8. Problems facing manufacturers and distributors will be discussed. Executive committees of the two organizations are scheduled for Dec. 7. R. Kennedy Hanson, 1108 Clark building, Pittsburgh, is secretary of the American association, and H. R. Rinehart, 505 Arch street, Philadelphia, secretary of the National association.

SCRAP INSTITUTE ARRANGES ST. LOUIS MEETING PROGRAM

Theme of the eleventh annual convention of the Institute of Scrap Iron and Steel Inc., Hotel Jefferson, St. Louis, Jan. 10-12, will be "Streamlining for Service and Profits."

Developments of the past year in the institute and the industry will be reviewed in addresses by Michael V. Bonomo, president, and E. C. Barringer, executive secretary. An attendance of over 400 is anticipated. Convention entertainment is being arranged by a committee of the St. Louis chapter headed by Alvin A. Wolff.

Headquarters of institute is at 11 West Forty-second street, New York.

PREPARE FOR FIRST ROAD SHOW ON PACIFIC COAST

"Highways of Tomorrow" will be the keynote of the thirty-sixth annual convention and highway exhibit of the American Road Builders' association in Civic auditorium, San Francisco, March 7-10. The Road show will be the first on the West Coast.

AIME SECTION TO DEVOTE SESSIONS TO OPEN HEARTHS

Pittsburgh section of the Open Hearth committee, American Institute of Mining and Metallurgical Engineers, will hold a meeting at the bureau of mines auditorium, Pittsburgh, Dec. 9. The program will be devoted to open-hearth construction and practice, with sessions arranged for afternoon and evening. R. C. Good, metallurgical engineer, Electro Metallurgical Co., Pittsburgh, is chairman of the section.

Study Machine's Effect on Labor

■ RESEARCH into the effect of machines on employment and standard of living is being undertaken by American Society of Tool Engineers, Detroit. John M. Younger, professor of industrial engineering, Ohio State university, has been appointed general chairman of the fact-finding committee.

Walter F. Wagner, president, said: "While individual members of our society have definite opinions on the subject, based on personal experiences, the society itself, as a technical organization, has no opinion. Its program is conceived on the premise that the real facts, whatever they may tend to prove or disprove, will be welcomed by everybody."

The plan involves co-operation by universities, publications, economists, national research boards and other sources, in the effort to obtain all possible data.

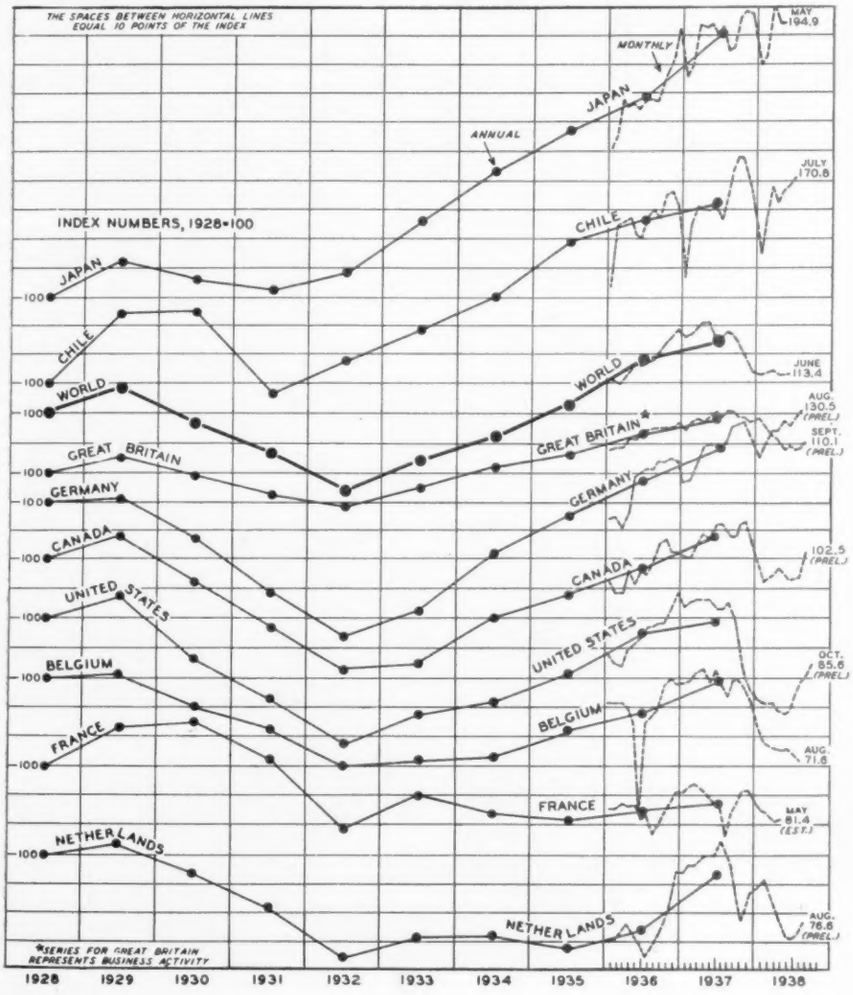
Subcommittees have started work and a report on bibliography will be made March 13, the day preceding opening of the Machine and Tool Progress exhibition in Detroit.

United States Below World Recovery Rate

■ Recovery in this country's industrial production is lagging behind the world index, and is exceeded by Japan, Chile, Great Britain, Germany and Canada. The accompanying chart shows the relative progress since 1928. Figures are by National Industrial Conference board, New York.

World production showed marked improvement during September for the third consecutive month. Activity advanced in the United States, Great Britain, Canada and the Scandinavian countries. Declines occurred in France, Germany, Belgium, Italy and Japan. There has been little net improvement in business conditions in the majority of the Latin American countries.

A summary of views received from foreign sources associated with the board indicates that the Munich agreement holds no guarantee of permanent peace in Europe, is merely a truce. This opinion is confirmed by the fact that as a reaction to Munich all nations are increasing armament expenditures at an accelerated pace.



■ Hazard Wire Rope division, American Chain & Cable Co. Inc., Wilkes-Barre, Pa., reports that its payroll carries the names of 14 employes, each with individual records of 40 to 67 years of service.

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MIRRORS OF MOTORDOM

BY A. H. ALLEN
Detroit Editor, STEEL

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DETROIT

■ MANY industrial executives not closely associated with the automotive industry are looking askance these days at reports of near-boom conditions emanating from this district. In cities even as nearby as Toledo, O., business leaders smile when told of the intense pressure to get out cars, and reply approximately as follows:

"Yes, but we hear those stories every year at this time. Are they actually selling the cars? Who are buying them? Where are they getting the money? Isn't the rush just to get the dealers stocked?"

Figures Prove Real Demand

Digging through the publicity ballyhoo which always attends introduction of new models reveals concrete evidence that new cars are moving into buyers' hands, and at a rapid rate. The pressure on production is not to fill dealers' showrooms but to fill orders already on books. A few figures will prove the point.

Deliveries of Cadillac and La Salle to customers in the first 20 days of November totaled 2681 cars, an improvement of 28 per cent over a year ago. Assemblies are running at better than 1000 per week. Unfilled orders exceed the total on hand at the same time in 1936 when a 5,000,000-car year was dawning.

Since the introduction of 1939 models, Hudson already has shipped a volume of cars equal to one-third the entire shipments of the 1938 season. Retail sales for the week of Nov. 19 were the highest of any week this year. Field stocks are lower than at the same time last year. Assemblies are running on the basis of about 2500 per week.

Buick retail deliveries for the second ten-day period this month totaled 7246 units, an increase of almost 10 per cent over last year. Used car sales in the same period totaled 9683, compared with 8883 for identical period last year. Used car stocks are 18 per cent lower than last year. Assemblies are coming close to the 7000 weekly mark and are at a record high for the company.

Shipments of Willys-Overland for the week ending Nov. 26 exceeded those of any week this year, despite the holiday interruption. Orders on hand for shipment in December are 50 per cent more than the total for the same month last year. Production is at a rate of better than 1000 weekly, with the plant operating five days and shipments on a six-day schedule.

Run on down the list of other producers and much the same situation holds true. Summing up, demand continues unabated, production still increasing though tending to level off, dealers' stocks below normal.

Bonanza for Steel

The current "boom" in automobiles has been a bonanza for steel business in this district. Buys necessarily have had to be stepped up to meet assembly line demands, and steel company representatives look forward to a continuation of steady commitments for the next two months. Somewhat of a leveling off is anticipated in February from automobile accounts, but already improved buying is developing from other sources which will more than make up for any prospective slackening in demand for automobile steel.

As has been proved so many times before, good business in the automotive industry is contagious and is soon reflected throughout other industries. For this reason, industry in general is deriving much encouragement from the spurt in automobiles, notwithstanding the fact current activity in extra-automotive fields is predominantly slack.

■ AS THE turn of the year approaches, the far-term outlook possibly assumes as much importance as the near-term, which is definitely good. One business man here who has been right more often than he has been wrong, charts the situation about as follows: Next year (1939) will show an overall improvement of about 22 per cent (automobile production). The curve will be steadily upward except for a slight dip starting in May and lasting through August.

Sees Improvement Until 1943

The year 1940 will show a more gradual improvement with another dip in the summer. In 1941 the increase will be accelerated, and a sharp improvement will develop in 1942, and again in 1943. Early in 1943 the sky will again be the limit and a speculative boom will be snowballing at a terrific rate.

This chartist sees the inevitable crash in the fall of 1943, following a year in which automobile production will top 6,000,000. The debacle, so he forecasts, will be even more severe than the crash of 1929, and he is arranging all his programs over the next five years so that capital expenditures will be amortized by the fall of 1943, and he will be able to see the world topple about him while he goes unscathed.

Admittedly it is difficult if not impossible to do any dependable long-range forecasting of this sort, which naturally cannot take into consideration any unlooked-for occurrences such as war, flood, fire, strikes and other "incidents beyond control." Nevertheless it represents the thinking of one buyer-engineer-

salesman who has been in the "business" for 20 years or more.

■ LIGHTNING of labor unrest continues to strike at scattered points throughout the automotive industry. Ten days ago a brief disturbance at the Chevrolet gear and axle division here interrupted production, affecting about 200 men. It was settled quickly and production resumed after week-end deliberations. The trouble was reported to have been the outgrowth of the discharge of several union stewards.

Last Wednesday, 60 men stopped work in the Plymouth body-handling division and successfully jammed up operations in the entire plant, throwing 6000 into idleness. The interruption choked up the flow of bodies from the Briggs plant which was forced to close shortly after and an additional 6900 men were sent home one hour after the trouble at Plymouth developed. Thus 12,900 day shift employes were without work. Work was resumed on the afternoon shifts.

The dispute was said to have been over wage increases demanded by the 60 men who quit work. The interruption was entirely unauthorized by UAW officials and disciplinary action against these malcontents was expected.

Minimum wage rate of 75 cents an hour has been left unchanged in the new contract with the UAW signed by Hudson last week. Overtime pay includes time-and-a-half for all work over 8 hours per day and 40 hours per week, with double time for Sundays and six legal holidays. Previous contract with the UAW expired last spring.

■ STUDY of eight large Toledo, O., industries operating in several different fields and able to furnish comparable data over a period of years shows an average investment of $4219 in machinery, plant and equipment per employe last year. In some individual industries this investment was as high as $27,480 per employe and in the lowest it was $1051.

The study, made by certified public accountants, shows that these eight typical industries last year had 34,870 employes and 30,782 stockholders. In 1929 these same industries had 15,715 employes and 17,910 stockholders. Average investment per stockholder has dropped from $6507 in 1929 to $4780 by this process of greater diffusion of ownership.

A study of payrolls shows that the average annual wage in 1929 in these eight industries amounted to $1690, compared with $1521 last year, a decrease of just 10 per cent. However, there has been a concomitant decline of more than 10 per cent in average hours worked per week, and changes in commodity prices have made it possible for the wage earner to buy considerably more with his present dollar than he did in 1929. Thus, in terms of buying power his wages have advanced about 17 per cent in nine years.

Taxes per employe were $223 in 1929 for the lesser number of employes (15,715), and $258 in 1937 for over twice as many employes (34,870). In 1929 a total of $327 per stockholder was retained in business and reinvested to produce more jobs, whereas under tax laws which force distribution of earnings last year an average of only $60 per shareholder was retained for reinvestment.

Further in this study, an analysis was made of how the average sales dollar of these eight industries was spent. It showed: 49.3 cents for raw materials; 30.3 cents for wages; 5.1 cents for taxes; 12.6 cents for dividends; 1.6 cents for research and 1.1 cents returned to the business.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1936	1937	1938
Jan.	377,244	399,186	227,130
Feb.	300,810	383,900	202,589
March	438,943	519,022	238,598
April	527,625	553,231	238,133
May	480,518	540,377	210,183
June	469,368	521,153	189,399
July	451,206	456,909	150,444
Aug.	275,934	405,072	96,936
Sept.	139,820	175,630	89,623
Oct.	230,049	337,979	†215,296
10 mos.	3,691,517	4,292,459	†1,858,331
Nov.	405,799	376,629	.....
Dec.	518,958	347,349	.....
Year	4,616,274	5,016,437	.....

†Revised.

Estimated by *Ward's Reports.*

Week ended:	1938	1937†
Nov. 5	80,030	89,770
Nov. 12	86,300	85,325
Nov. 19	96,735	85,757
Nov. 26	84,930	58,955
Dec. 3	98,695	86,848

†Comparable week.

	Week Ended Dec. 3	Nov. 26
General Motors	44,505	40,125
Chrysler	25,270	20,840
Ford	17,850	14,000
All others	11,070	9,965

■ PLYMOUTH statisticians figure the average 1939 model requires in its construction a little over 2000 pounds of steel, 33 pounds of copper and brass, 27 pounds of lead, 144 pounds of cast iron, 2 pounds of tin, 110 pounds of rubber, 18 square feet of safety glass, 13 square yards of upholstery fabric and 2½ gallons of paint. The car also requires 5½ man-weeks of work to build.

Two new 1939 model De Sotos have been put into production—deluxe and custom 7-passenger limousines on 136-inch wheelbase and with 100-horsepower engines. They are built to special order.

■ THE FOLLOWING item appeared in a recent issue of the *Detroit Times:*

"The manager of a steel plant told a reporter: 'You never store an oversupply of steel because it gets stale. Steel must be stored with the grain running north and south. If they don't like the way the grain runs they change it . . . by rolling. A precision axle will warp out of shape if laid east to west . . . due to the magnetic pull.'"

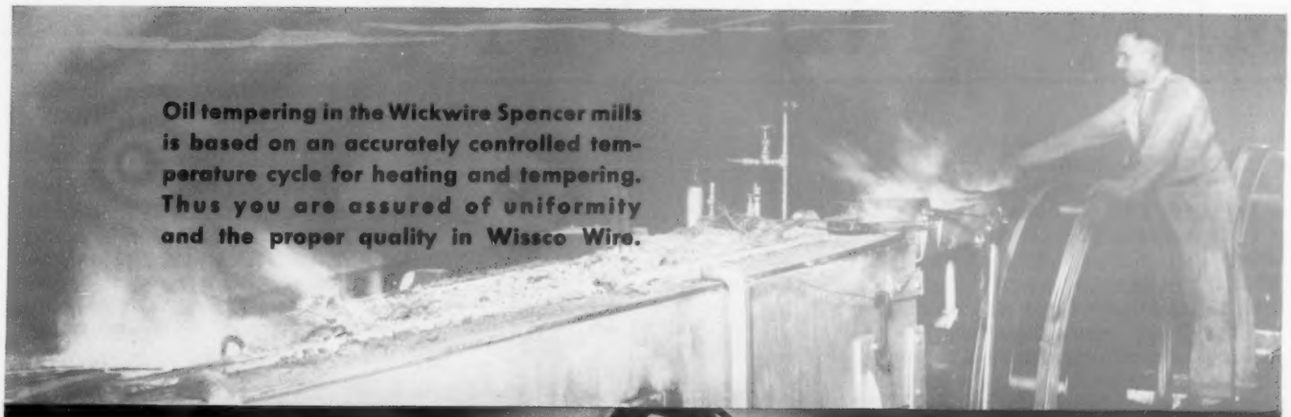
At first glance this would appear to be one of those fantastic tales about steel published from time to time in the press, but upon closer examination, the statements prove to be popular conceptions of known metallurgical phenomena.

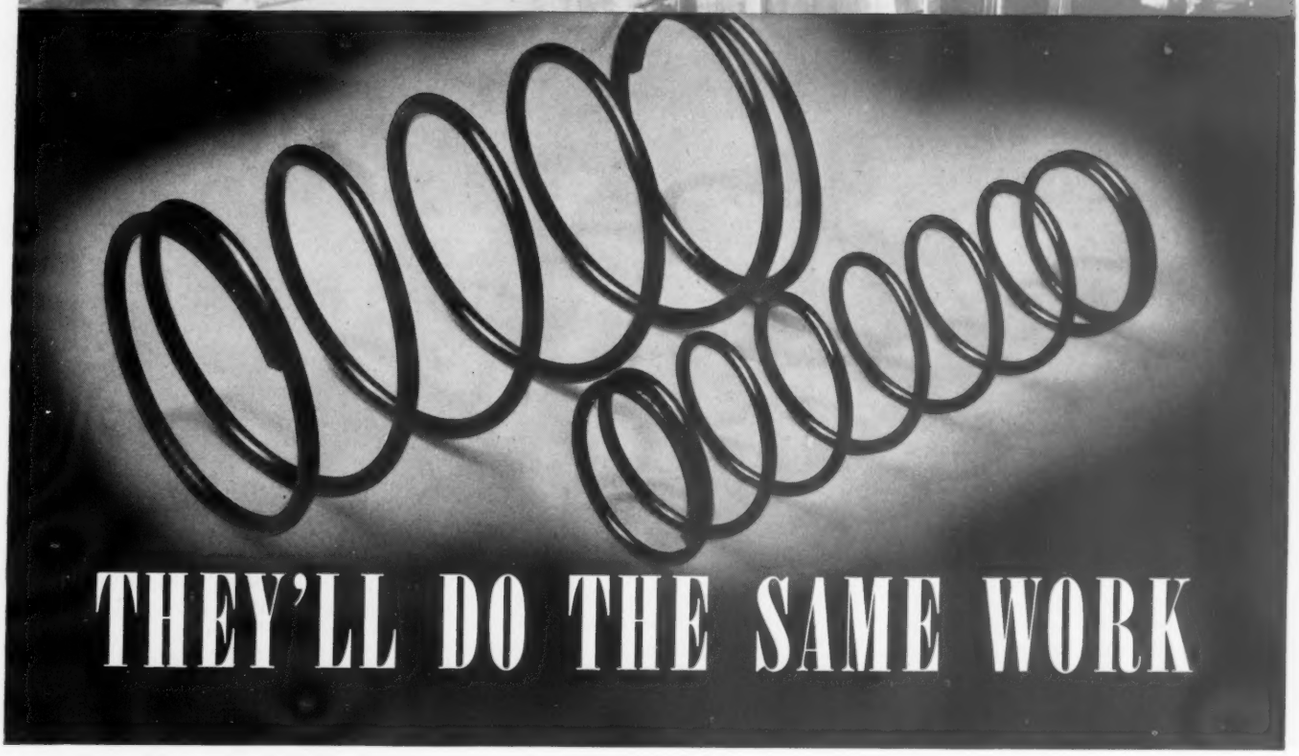
Steels, especially cold-rolled sheets, do "get stale," or more correctly, age harden, making it difficult to fabricate properly in presses. The tendency of low-carbon material which has been skin passed to age harden in as short a time as two weeks is well known among metallurgists, some lots of steel increasing in hardness from 40 Rockwell C to as much as 50-53 in this period of time. Instructions sent to customers on shipments of cold-rolled sheets frequently advise fabrication within 14 days.

The magnetic effect is less well known and understood. Certainly it is not essential from a practical standpoint to store steel "with the grain running north and south." Metallurgists agree that in some localities a pronounced magnetic effect on the grain in a low-carbon steel is felt and it is probably possible that precision parts might warp out of shape in these localities. By and large, however, it is doubtful whether there need be much concern over this magnetic effect, although some metallurgists are of the opinion the subject is a ripe one for investigation.

More Highways Improved

■ More than 15,000 miles of highway have been improved during the past year under the federal-state program supervised by the agriculture department's bureau of public roads, according to the bureau's annual report. This exceeds the average improvement mileage for the last ten years. The bureau's safety work also included elimination of 711 grade crossings, rebuilding of 144 crossings and protection of 744 by signs and signals.


Oil tempering in the Wickwire Spencer mills is based on an accurately controlled temperature cycle for heating and tempering. Thus you are assured of uniformity and the proper quality in Wissco Wire.



THEY'LL DO THE SAME WORK

23rd in a series of advertisements designed to help you make a better selection of wire for maximum value per unit of cost.

Irrespective of its physical dimensions, a spring is only as big as the work it will do. These two springs are alike from a work standpoint . . . they withstand full compression without permanent set and carry the same load. The larger spring is made from a high quality of high drawn wire, while the smaller one is made from oil tempered wire with a much higher elastic limit. When dimensions are limited by space or weight, there is no substitute for oil tempered wire.

The cost of oil tempering is more than justified when your requirements are best served by its use. Wickwire Spencer's wire experts stand ready to advise you on the relative costs of finished springs made of both kinds of wire, and to suggest when it is advisable to use each type. The use of the most suitable wire enables you to make the best product . . . at the lowest cost.

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by Wickwire Spencer

MEN OF INDUSTRY

■ AVERY C. ADAMS, manager of sales, sheet division, Carnegie-Illinois Steel Corp., Pittsburgh, has resigned to become vice president and assistant general manager of sales, Inland Steel Co., Chicago. Prior to joining Carnegie-Illinois in 1936, Mr. Adams was vice president in charge of sales, General Fireproofing Co., Youngstown, O. He began in 1920 in the sales department of Trumbull Steel Co., Warren, O., now a part of Republic Steel Corp.

Howard V. Clark has been appointed manager of sales, sheet division, Carnegie-Illinois, succeeding Mr. Adams. A graduate of the United States naval academy and a former officer of the navy, Mr. Clark began with the former Carnegie Steel Co. in 1927. He became assistant manager of sales, Detroit sales office, in 1932, and has been general manager of the order division since October, 1936.

♦

C. L. Popp, formerly with the Reynolds Spring Co., Jackson, Mich., has become plant superintendent for Thermo-Plastics Inc., St. Clair, Mich.

♦

Walter A. Parrish has resigned from the Buda Co., Harvey, Ill., as chief engineer in charge of design and development of gasoline and diesel engines for automotive, industrial and marine application.

♦

George E. Dix will retire Dec. 31 as president, Steel Union-Sheet Piling Inc., New York. The past 12 years he has represented the United Steel Works of Germany in this country as distributor. Starting with Carnegie Steel Co. in 1907, he later became associated with Central Steel Co. at Massillon, O., the

Avery C. Adams

Midvale Steel & Ordnance Co., Philadelphia, and the Consolidated Steel Corp. He will make his home in Virginia.

♦

Clyde P. Craine has resigned as president and director, Craine-Schrage Steel Co., and vice president and director, Detroit Steel Corp., both of Detroit, because of ill health. He was one of the Craine-Schrage founders.

♦

J. K. Garretson has been appointed district sales manager for Republic Steel Corp. in its Denver office. He succeeds the late Edward C. McSheehy. Since 1937 Mr. Garretson has been resident salesman at Memphis, Tenn., working under the Birmingham, Ala., district office, prior to which he was associated with Republic's Philadelphia district sales office 15 years.

♦

Harvey L. Ramsay, for a number of years sales manager, J. D. Wallace & Co., Chicago, has been appointed sales promotion manager, Porter-Cable Machine Co., Syracuse, N. Y., manufacturer of industrial sanding machines, floor sanders, electric hand sanders and hand saws.

♦

T. W. Pennington, the past several years district manager in Cleveland for Jessop Steel Co., Washington, Pa., has become sales manager for the company, with headquarters at Washington, Pa. He has been succeeded at Cleveland by F. P. McGahan, formerly service manager attached to the mill staff at Washington.

♦

Thomas E. Richards, the past four years in the marketing department of eastern operations, Socony Vacuum Oil Co., has been appointed midwestern marketing operations representative at 26 Broadway, New York. His activities will be devoted to both the field of industrial lubricants, and to process petroleum products.

♦

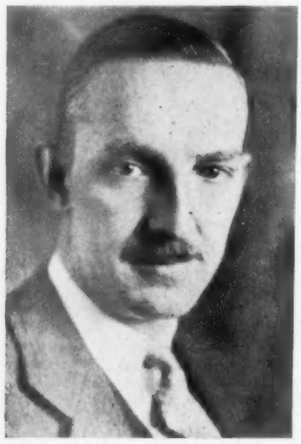
E. E. Wright has been appointed district manager, Cleveland, for Electro Metallurgical Sales Corp., New York, with headquarters in the Union Commerce building, Cleveland. After graduating from Lehigh university, Bethlehem, Pa., in 1912, Mr. Wright entered the employ of Bethlehem Steel Co., Bethlehem. In 1918 he joined the Electrode division of National Carbon Co., New York, transferring in 1937 to Electro Metallurgical Sales Corp. Both National Carbon Co., and Electro Metallurgical Sales Corp. are units of Union Carbide & Carbon Corp., New York.

♦

John N. Marshall, Bethlehem, Pa., and R. H. McClintic, Pittsburgh, have been elected to the board of trustees and executive committee of Koppers United Co., Pittsburgh. Mr. Marshall is assistant general

Howard V. Clark

J. K. Garretson



John N. Marshall

manager, fabricated steel department, Bethlehem Steel Co., and Mr. McClintic is assistant to the president, Koppers Co., and is in charge of advertising and sales promotion.

♦

J. Carlton Ward Jr. has been appointed vice president and a director, United Aircraft Corp., New York, and general manager, Pratt & Whitney Aircraft division of the company, East Hartford, Conn. He succeeds C. W. Deeds, who has resigned to become president, Chandler-Evans Corp., Detroit. H. Mansfield Horner, identified with Pratt & Whitney since 1926, has been named assistant general manager of the division.

♦

E. H. Heilstedt has been appointed assistant to the superintendent of industrial relations, and A. H. Kofoed has been named director of

A. H. Kofoed

personnel and employment, Gary works, Carnegie-Illinois Steel Corp. Mr. Heilstedt has been associated with Carnegie-Illinois since 1915 and Mr. Kofoed began service with the corporation in 1936 as director of personnel and employment at the South works.

♦

R. G. Caulley, J. F. White and C. A. Poxson have been appointed assistant district sales managers in the Detroit office of Republic Steel Corp. Mr. Caulley joined Republic's Detroit office in 1934, before which he was associated with the Detroit sales department of Wheeling Steel Corp. Mr. White, in 1918, became a salesman for United Alloy Steel Co. in the Detroit district, and remained in Detroit when he took a similar post with Interstate Iron & Steel Co. in 1926. He continued in the Detroit office after Interstate merged with Republic. Mr. Poxson joined Newton Steel Co. in a sales capacity in Detroit, in 1927 was made district

E. H. Heilstedt

sales manager; and in 1936 became associated with the Detroit sales department of Republic.

♦

William S. Johnson, associated with the American Car & Foundry Co., New York, 53 years, the past 17 as district manager at Berwick, Pa., has retired.

He has been succeeded by Guy C. Beishline, who began his career at the Berwick plant, and after working there for several years, resigned in 1914 to join the Mt. Vernon Car & Mfg. Co., where he became plant manager, vice president and director. He rejoined American Car & Foundry in 1937 as special assistant on the staff of the vice president in charge of operations.

♦

R. J. Schuler, general sales representative, Union Drawn Steel division of Republic Steel Corp., has been appointed assistant manager of sales, bolt and nut division, with headquarters in Cleveland. He became associated with Republic last spring after serving 13 years in various sales capacities with LaSalle Steel Co. Previous to his association with LaSalle he was with Chal-

R. J. Schuler

mers Motor Co. and the Detroit Gear & Machine Co., in production and purchasing capacities.

DIED:

■ EDWIN FROGGETT, 84, pioneer Youngstown, O., blast furnace man, and a brother of Joseph F. Froggett, senior editor of *Daily Metal Trade*, in that city, Nov. 26. In the 1880's he became manager of the old Citco blast furnace near Chattanooga, Tenn., later moving to Birmingham, Ala., where he managed a blast furnace there. Subsequently he operated a furnace at Saxton, Pa.; one at Scottdale, Pa., for Corrigan, McKinney Steel Co.; the Struthers furnace for Runyon, Stubb & Co., predecessor to Struthers Iron & Steel Co., and at Kittaning, Pa. He retired 30 years ago.

♦

B. E. V. Luty, 68, Pittsburgh representative, *American Metal Market*, in Pittsburgh, Nov. 29.

Mr. Luty attended Western University of Pennsylvania, now the University of Pittsburgh, and during his college years assisted Dr. Samuel P. Langley in an aerodynamics investigation at Allegheny observatory. Graduating in 1891, he joined Carnegie-Phipps Co. as a draftsman a year later. His first job in industrial reporting was with *American Manufacturer and Iron World* as mechanical editor. Mr. Luty was for years an editorial contributor to *Iron Trade Review*, STEEL's predecessor.

♦

Arthur S. Hughes, 60, president and founder, Hughes-Keenan Structural Iron Co., Mansfield, O., in that city, Nov. 27.

♦

Tint Champlin, 72, chairman, Cataraugus Cutlery Co., Little Valley, N. Y., in Bradford, Pa., recently. He was identified with the cutlery industry for more than a half century.

♦

J. Ben Campbell, 74, for many years president, McNeil Machine & Engineering Co., Akron, O., at his home in that city recently. He retired two years ago after 46 years' service with the company.

♦

John M. Paton, 69, an employe of American Steel & Wire Co., Cleveland, 45 years, and a member of the president's staff since 1936, in Cleveland, Nov. 27. A native of Scotland, Mr. Paton's first job was with the old Consolidated Steel & Wire Works, Joliet, Ill. He was transferred to Cleveland 21 years ago.

EDITORIAL

Forum on Re-employment

■ IT BECOMES increasingly apparent, as the implications of their provisions are understood, that the income security and lay-off benefit plans recently announced by General Motors Corp. are of historic significance. Under these plans (STEEL of Nov. 21, page 29) employes with the corporation five years or more will receive at least 60 per cent of their standard weekly earnings each week, while employes with the corporation two years or more will receive 40 per cent of standard earnings but in their case the amount so advanced will not exceed the equivalent of seventy-two hours' earnings.

These plans go a long way toward promoting security by removing much of the employe's former uncertainty as to how much money would be in his pay-envelope at the end of the average week, and as to how soon a slowing down of the production line would mean a lay-off and an interruption in pay. There is no question that plans of this kind will do much to promote better industrial relations in the automobile industry.

Good Industrial Relations Valuable But Worker Must Have Job First

That management in general is giving serious thought to security as a basic factor in good industrial relations is reflected strikingly by testimony recently given by some well-known industrial executives before a tax subcommittee of the senate. This reveals that incentive taxation is seen by some authorities as a means of encouraging re-employment of idle workers and by others as a form of penalty against certain industries. Most industrial spokesmen who touched on the subject, however, were agreed that profit-sharing systems are desirable as a means of promoting and maintaining good labor conditions, and testimony revealed that a good many companies regard themselves benefited by such systems.

Progress now being made along these lines is wholesome. Such plans, as time goes on, are bound to convince the average employe that his relation with his employer takes on the nature of a partnership and that anything that affects the employer adversely has a bad effect on the employe. And with the spread of such an attitude labor troubles should diminish in number and gravity and there should be a general disposition to encourage industry.

One problem remains unsolved under these plans. This is unemployment. This problem must be solved before we can hope to develop the degree of prosperity that is suggested by our vast resources and by the desire of our people for higher living standards.

Employer Views on Means To Combat Idleness Will Be Presented in Forum

In order to stimulate the movement of idle men back into gainful employment, STEEL is preparing to launch a regular feature to be entitled "Forum on Re-employment." Under this head many leading employers in the machine tool and other capital goods industries will set forth suggestions as to what sort of a national program will solve the unemployment problem by enabling private industry to offer gainful employment to all who are able and willing to work. This forum will be initiated in an early issue and will be continued over an indefinite period. It is hoped that the thinking it will reveal will suggest a sound, broad approach on the unemployment problem, thus paving the way for the eventual return of permanent prosperity in this country.

THE BUSINESS TREND

Activity Index Reflects Holiday Interruption

■ RECORDS of business for the week ended Nov. 26 are distorted somewhat by interruptions for Thanksgiving day. Due to this factor, and partly to the slight decline in steelmaking operations from the peak this year, STEEL'S index of activity dropped 6.4 points from 100.4 to 94 per cent. A year ago the index declined 12.2 points to 72.7 per cent during the holiday week. The average loss over the past ten years recorded by the index for Thanksgiving day week is 5.5 points.

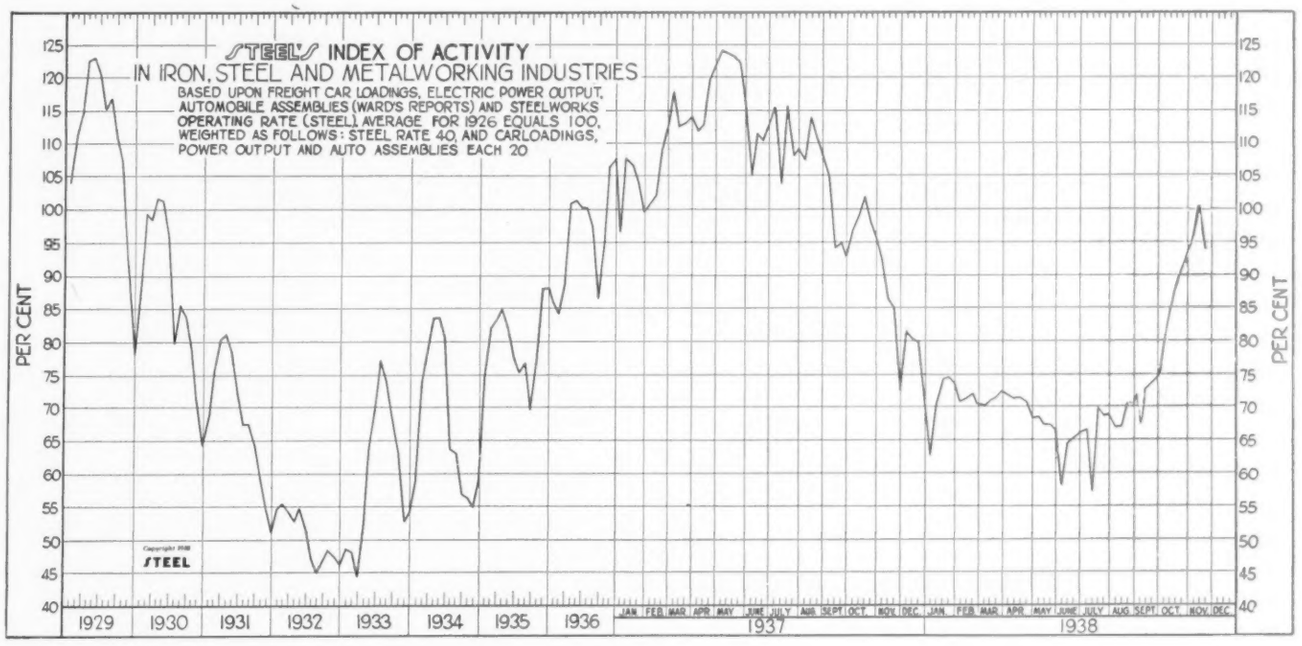
The national steel rate eased 1 point in the week ended Nov. 26, from its peak of 63 per cent for the year, reported in the preceding week. Despite this, steelworks operation is approximately double that of the comparable week last year. There are some indications that this year's peak in steelmaking activity has been passed, and a leveling off at slightly lower levels is anticipated.

While daily average output of automobiles continued to increase during the week total assemblies declined because of the one-day shutdown. Production of 84,930 units in the week ended Nov. 26 was 11,805 less than in the preceding week. In the comparable week last year assemblies totaled 58,955. A sharp rebound is expected.

The decline in revenue freight carloadings during the holiday week was slightly more pronounced than last year. The loadings are estimated at 568,060 cars, or about 89,417 less than in the preceding week. Last year loadings dropped 88,624 to 558,617 cars.

Also reflecting the holiday interruption electric power consumption fell from 2,270,296,000 kilowatt-hours in the week ended Nov. 19, to 2,183,807,000 kilowatt-hours. However, this exceeded the 2,065,378,000 kilowatt-hours consumed in the same week a year ago.

Exports of 425,431 tons of iron and steel products valued at $14,702,123 in October compared favorably with September's 346,068 tons, valued at $13,270,362, but remained below the October, 1937 volume, 522,611 tons valued at $26,588,036. Steel and iron imports in October, 26,345 tons, valued at $1,359,177 receded from September, 27,958 tons, valued at $1,375,484. In October last year imports aggregated 37,186 tons. For


STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL) AVERAGE FOR 1926 EQUALS 100, WEIGHTED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
PER CENT
125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40
1929 1930 1931 1932 1933 1934 1935 1936
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1937
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1938
STEEL

STEEL'S index of activity declined 6.4 points to 94.0 per cent in the week ended Nov. 26:

Week ending	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Aug. 20	70.5	110.3	97.9	77.0	61.4	74.2	44.9	67.3	88.5	116.4
Aug. 27	70.3	108.5	94.0	77.3	60.3	71.6	45.2	66.5	87.4	116.9
Sept. 3	72.3	104.8	87.5	70.9	55.1	70.3	45.4	65.3	79.0	106.3
Sept. 10	66.8	94.3	83.1	70.1	53.5	65.5	44.9	60.9	85.9	114.0
Sept. 17	72.9	95.0	90.1	69.4	58.7	69.1	47.8	65.6	86.2	112.2
Sept. 24	74.0	93.0	86.2	68.5	58.1	68.2	48.0	65.2	83.8	110.7
Oct. 1	74.9	96.6	89.0	73.3	59.3	66.9	47.7	62.4	81.0	109.1
Oct. 8	78.9	99.0	93.4	74.9	54.7	67.4	48.4	61.5	79.4	108.2
Oct. 15	84.3	101.8	95.5	77.4	56.4	66.0	48.7	57.9	77.5	106.1
Oct. 22	88.7	97.5	97.1	82.4	58.2	60.9	48.7	58.2	77.4	104.8
Oct. 29	91.4	95.7	99.1	86.4	56.3	58.0	48.3	55.9	72.5	102.5
Nov. 5	93.4	92.3	102.1	88.4	55.0	52.3	48.5	56.0	71.5	98.1
Nov. 12	95.9	86.5	107.9	88.8	54.9	50.7	47.7	55.5	73.0	91.6
Nov. 19	100.4†	84.9	109.9	90.9	55.2	52.6	49.2	54.8	71.0	87.8
Nov. 26	94.0*	72.7	105.2	86.0	54.4	55.4	44.5	51.4	66.9	80.9

*Preliminary. †Revised.

the first ten months ended Oct. 31, 1938 exports totaled 4,193,016 tons, against 6,384,848 tons in the period a year ago. The 208,157 tons of iron and steel products imported in the first ten months this year was less than half of the 480,372 tons imported in the corresponding period in 1937.

AUTOMOBILE ASSEMBLIES ADVANCE SHARPLY

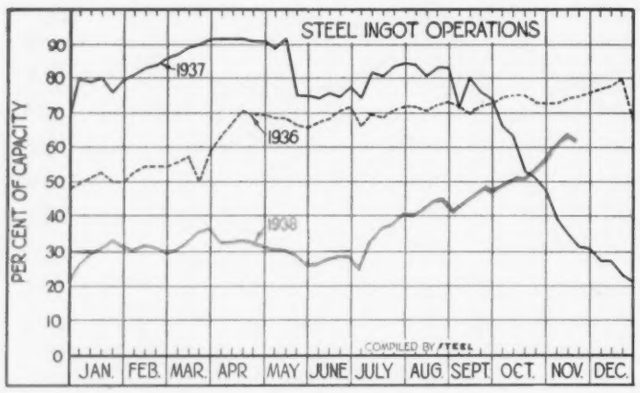
Production of automobiles, including passenger cars and trucks, in the United States and Canada, totaled 215,296 in October, according to the United States department of commerce. This represented a substantial increase over 89,623 in September, low point in the calendar year. In October, 1937, 337,979 were assembled. For the ten months this year production totaled 1,858,381 compared with 4,292,459 in the period last year.

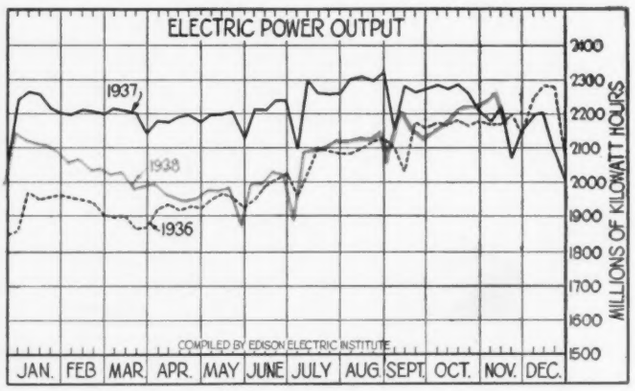
INDUSTRIAL PRODUCTION CONTINUES UPTREND

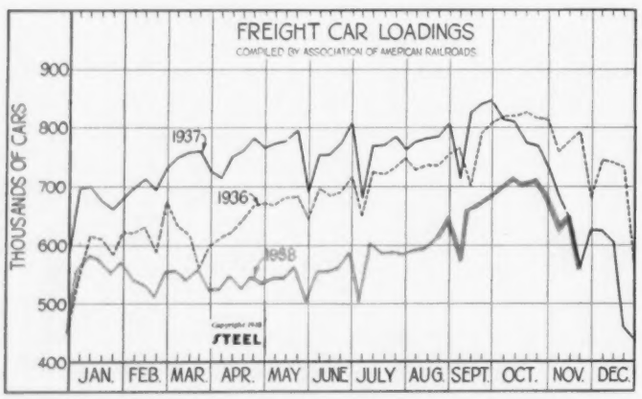
With larger output of steel and automobiles, industrial production continued to increase in October, according to the Federal Reserve board's seasonally adjusted index. The index rose 6 points to 96 per cent of the 1923-1925 average, but remained below the 102 per cent reported in October, 1937. Factory employment and payrolls also showed a substantial rise. Sales by department and variety stores and mail order houses showed less than the normal seasonal increase, attributed in part to the unusually warm weather during the month. Further improvement in industrial production was forecast for November.

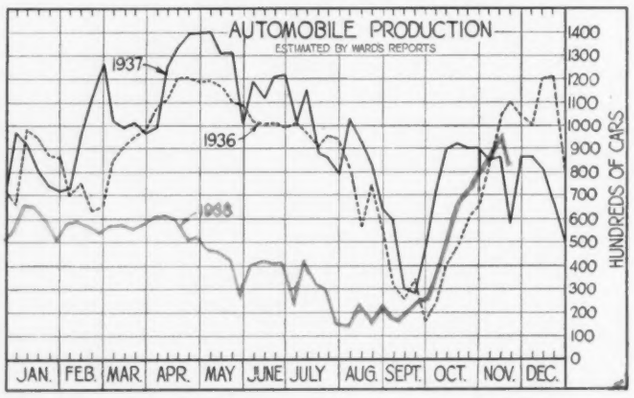
FAILURES INCREASE SEASONALLY

Following the seasonal trend—as computed from averages over the past ten years—commercial failures increased 15 per cent in October over September. This percentage is considerably less than in three of the preceding four years, which ranged from 31 to 35 per cent. Failures in the month totaled 997, with $13,219,000 liabilities, against 866 and $14,341,000 in September, and 815 and $14,079,000 in October, 1937. In contrast, failures in manufacturing declined from a year ago. As usual, retail trade casualties predominated, aggregating 627, and liabilities of $5,251,000.



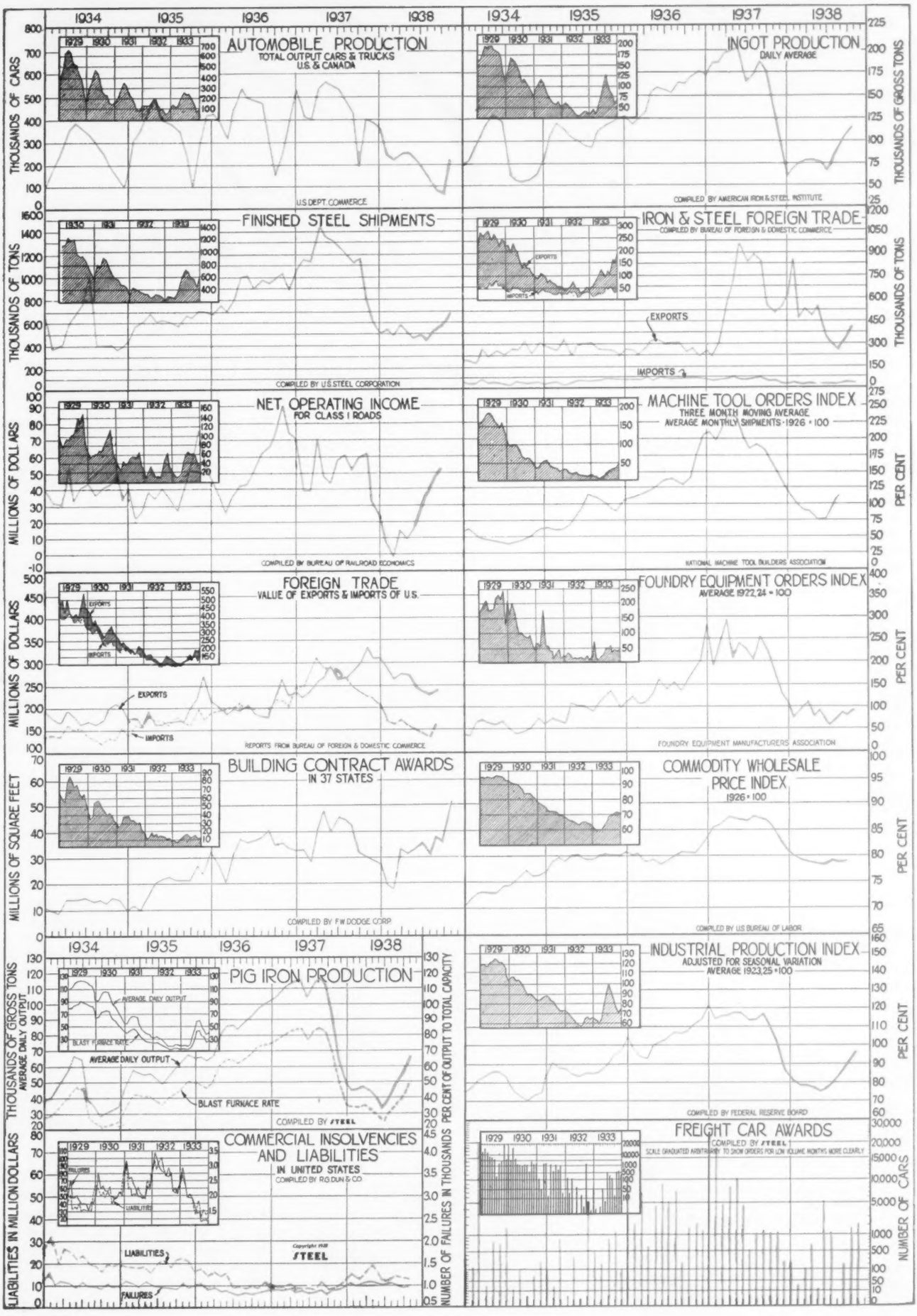






Week ending	Steelworks Operating Rate Per Cent 1938	1937	1936	Electric Power Output Million KWH 1938	1937	1936	Freight Car Loadings 1938	1937	1936	Weekly Auto Output 1938	1937	1936
Aug. 20	41.5	81.0	72.0	2,138	2,304	2,125	597,918	781,247	734,973	23,940	93,339	73,709
Aug. 27	43.5	83.0	73.0	2,134	2,294	2,135	620,511	787,373	753,742	18,700	83,310	53,937
Sept. 3	44.5	83.0	71.5	2,148	2,320	2,098	648,039	804,633	764,680	22,165	64,200	31,628
Sept. 10	41.5	72.0	69.5	2,048	2,154	2,028	568,887	711,299	699,859	17,485	59,017	26,750
Sept. 17	46.0	80.0	72.5	2,214	2,280	2,170	660,142	826,565	789,510	16,100	30,150	33,165
Sept. 24	48.0	76.0	73.0	2,154	2,265	2,157	675,553	840,446	807,070	20,390	28,030	15,680
Oct. 1	47.0	74.0	74.5	2,139	2,275	2,169	697,938	847,245	819,126	25,405	45,830	22,800
Oct. 8	48.5	66.0	75.0	2,154	2,280	2,168	702,964	815,122	820,195	37,665	71,958	39,945
Oct. 15	51.5	63.0	75.0	2,182	2,276	2,170	726,612	809,944	826,155	50,540	89,680	48,195
Oct. 22	51.5	53.0	73.0	2,214	2,281	2,166	705,628	773,353	815,972	68,360	91,905	59,740
Oct. 29	54.5	51.0	73.0	2,226	2,254	2,175	708,840	771,655	814,175	73,335	90,155	66,985
Nov. 5	57.5	47.0	73.0	2,207	2,202	2,169	673,333	732,145	759,318	80,030	89,770	84,305
Nov. 12	61.5	39.0	74.0	2,209	2,176	2,169	636,710	689,614	784,672	86,300	85,325	104,248
Nov. 19	63.0	35.0	74.5	2,270	2,224	2,196	657,477†	647,251	790,500	96,735	85,757	110,160
Nov. 26	62.0	31.5	75.5	2,183	2,065	2,133	568,060*	558,627	679,984	84,930	58,955	104,283

*Preliminary. †Revised.


1934
1935
1936
1937
1938
AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS U.S. & CANADA
THOUSANDS OF CARS
U.S. DEPT. COMMERCE
INGOT PRODUCTION
DAILY AVERAGE
THOUSANDS OF GROSS TONS
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
FINISHED STEEL SHIPMENTS
THOUSANDS OF TONS
COMPILED BY U.S. STEEL CORPORATION
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
NET OPERATING INCOME
FOR CLASS I ROADS
MILLIONS OF DOLLARS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS · 1926 = 100
PER CENT
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922-24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACT AWARDS
IN 37 STATES
MILLIONS OF SQUARE FEET
COMPILED BY F.W. DODGE CORP.
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
PIG IRON PRODUCTION
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
THOUSANDS OF GROSS TONS AVERAGE DAILY OUTPUT
PER CENT OF OUTPUT TO TOTAL CAPACITY
COMPILED BY STEEL
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923-25 = 100
COMPILED BY FEDERAL RESERVE BOARD
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES IN MILLION DOLLARS
NUMBER OF FAILURES IN THOUSANDS
FAILURES
Copyright 1938 STEEL
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW VOLUME MONTHS MORE CLEARLY
NUMBER OF CARS

Die Castings

Automobile manufacturers save production costs and add new beauty to this year's cars through use of die-cast front end grilles, headlamp bezels, louvres, parts for instrument panels and general hardware

By HERBERT CHASE

■ SEVERAL new structural or mechanical applications of die castings, as well as an extension of decorative uses, are in evidence in 1939 cars. External die-cast parts and those used in body interiors stand out most prominently and constitute an important styling factor, but many more or less hidden parts in die-cast form are continued and others are added to the listing of earlier years. Nearly all the die castings are of zinc alloy, but some small parts are die-cast of aluminum or brass alloys, chiefly where light weight or some special corrosion resistant properties are required.

Most prominent of all the die castings are those embodied in front ends. These include grilles (which are still the largest die castings employed, although grille castings average somewhat smaller than in some recent years); headlamp bezels, employed on nearly all the lamps which are recessed in fenders; nose and hood ornaments; louvres and similar parts. Die-cast grilles

Ten makes of cars, including a majority in the medium and high price brackets, use grills completely or partly die-cast in zinc alloy and handsomely plated. These include: (1) Hudson, (2) Studebaker, (3) Oldsmobile, (4) Buick, (5) Chrysler, (6) Cadillac, (7) Lincoln Zephyr, (8) Nash, (9) Pontiac and (10) LaSalle

for 1939 Cars

Buick's new direction signal, shown above, includes a die-cast housing for plastic lenses and twelve supplementary die castings of which ten are individual letters spelling "BUICK EIGHT"

are applied in ten out of fifteen makes of cars in the medium and high-priced groups, and the total number of makes using them has been increased even though two cars having them last year have reverted to pressed metal.

Accompanying illustrations showing fronts of the ten 1939 cars having die cast grilles, reflect the diversity of designs possible with this production method. Although the influence of the 1938 Zephyr design is apparent in a wide use of grilles in fender aprons—so called "catwalks"—a detail study indicates many variations of this general arrangement are possible. Some makes adhere to a solid nose or "prow," without openings; some provide the prow with openings in the sheet metal; others fit a die-cast grille in the nose as well as in the fender aprons; and still others confine the grilles to the fender aprons and die cast them in one or two sections at each side. Both vertical and horizontal bars are employed in the die-cast grilles and the spacing of the bars as well as their width varies greatly, some designs including both wide and narrow bars.

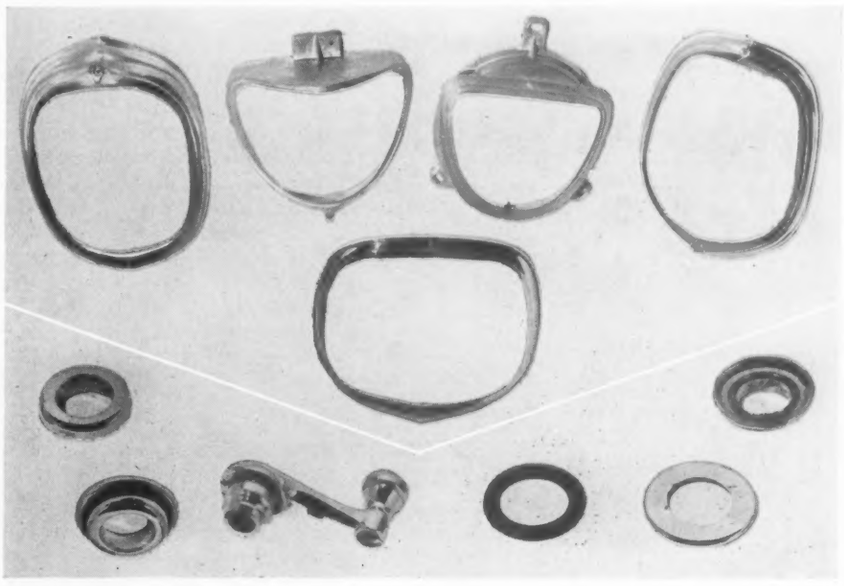
It is now common practice to make the nose ornament serve also as a handle for the hood latch. And the nose is provided in different designs with vertical and with horizontal moldings and in some cases carries the name and/or model in die-cast letters. Hood louvres are less common than formerly, but some of those which are continued are die-cast, and one maker combines a hood latch with the die-cast louvre, having dropped a stamped louvre.

Where headlamps are recessed into fenders, it is common practice to provide a die-cast bezel and sometimes a die-cast frame or enclosure for the hidden parts of the headlamp. Some stamped bezels are employed, but the odd shapes are not too easy to stamp. In addition, a stamped bezel requires supplementary fastening parts and assembly operations. Such parts can be made integral with the die casting and require no extra dies for assembly work.

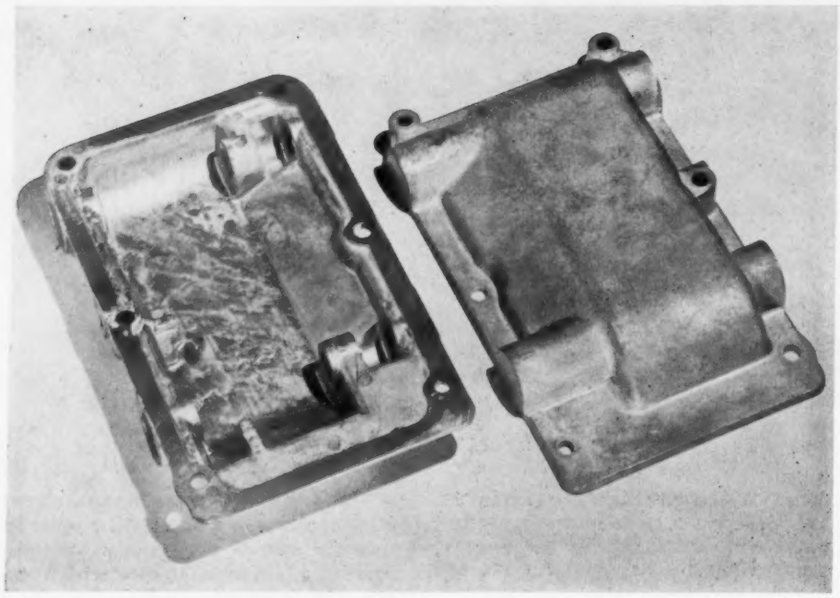
Among other die castings in which decorative features are important are those used on instrument panels, steering wheels, tail lamps and hardware. Similar parts have been die-cast before. Many radio grilles are now die-cast and often include supplementary parts for the new button tuning units and controls.

A departure found on some General Motors cars this year is the use of small plastic trim parts on cranks for window regulators and inside door handles, the knobs of the handles being die-cast but having a recess for a plastic button. Cranks and door handles proper have holes and recesses cored in the die casting, and into these are fitted the plastic trim strips fastened by hidden projections which are fused at the back after the plastic is in place. Escutcheons have a die-cast boss, a plastic ring and a stamped base assembled into one unit.

Most of the steering wheels which have flexible spokes and plastic rims continue with die-cast hubs and horn rings, but the die-cast parts are altered in detail to fit into new designs. At least one of the underwheel shifter levers is die-cast as result of determination that the die-casting had adequate



Nearly all cars with headlamps recessed in fenders employ bezels die-cast in zinc alloy (Above) and made to conform to irregular fender contours. In some cases die-cast mating parts hidden in the assembly are also used. (Below) Some die-cast hardware has interior parts with inserts on cranks, handles, bezels and knobs. Plastic parts are fastened between metal parts or slipped into cored recesses and fastened by fusing over projections which pass through the piece



Packard's new transmission has a die-cast, zinc alloy cover with recesses cored to receive shafts for shifter forks. A part of this kind requires only light cuts for machining

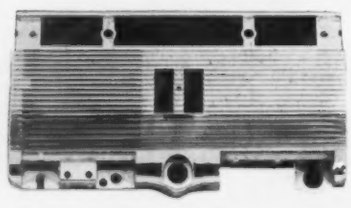
strength, cost less and had a smoother surface.

At the rear of the body, lamp housings for license lights, stop and tail lamps are as popular as ever. Some of the units have been shifted, however, from fender to body panels and have other design changes. Combination of the rear deck handle bracket and license lamp in a single die casting is found on several cars, and Buick is offering a built-in direction signal which includes, besides the housing, a dozen small die castings of which ten are individual letters spelling "BUICK EIGHT." Each of these letters has a hidden rearward projection cast integrally, which is fastened by a Speed nut after passing through a hole in the transparent plastic lenses supporting the letters.

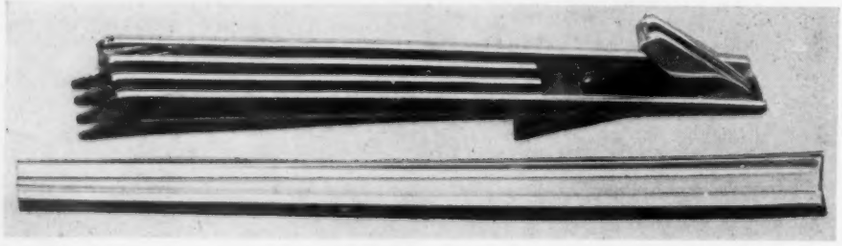
Among the new and more or less hidden parts deserving mention is a cover for the new Packard transmission. This part contains bosses with cored holes forming bearings for the shifter fork, shafts and, in common with most die castings, requires very little machine work—and this work necessitates only light cuts. Chevrolet's new vacuum booster shift also involves some new die-cast parts as do other vacuum shifters which do not as yet appear to have gained formal adoption by any car manufacturer. Some of the new underwheel shifting systems which are not using completely die-cast shift levers make use of small die castings such as bracket parts.

Several cars offer as optional equipment heaters having housings, fan and blower enclosures, ducts and fittings which are die-cast, often with section thicknesses averaging around 0.040-inch. The die-cast method proved to be lowest in cost. It also was selected because the nature of the process allows for integral attaching of bosses and the like.

Many parts of door locks, latches and regulators are die-cast to avoid plating. Strength and wear resistance are adequate. A large number of parts for carburetors, fuel pumps, windshield wipers, vacuum brakes and the like continue zinc alloy die castings. These have been produced in die-cast form for many years. Some of these are changed in design. In addition, many die castings are employed in trucks and in other automotive equipment besides passenger cars.



Among die-cast parts on instrument panels are grilles and supplementary parts for radio controls. Cadillac radio panel, shown at left, includes slides for control fittings. (Below) Buick has this die-cast louvre fitting on hood side panels. A matching part serves as a hood-latch handle



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World Steel Statistics By British Federation

■ *Statistics of the Iron and Steel Industry*, 1937; compiled by British Iron and Steel federation; 306 pages, 7 x 9½ inches; supplied by STEEL, Cleveland; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London, S. W. 1.

For 17 years the British Iron and Steel federation has compiled annually statistics of the iron and steel industry of all the industrial countries of the world, and it is probably the most comprehensive reference book of its kind. The present volume, which brings the information down to 1937 for the leading countries and to 1936 for others, follows fairly closely the general lines adopted in previous years, but has been made still more comprehensive by the addition of further tables and data.

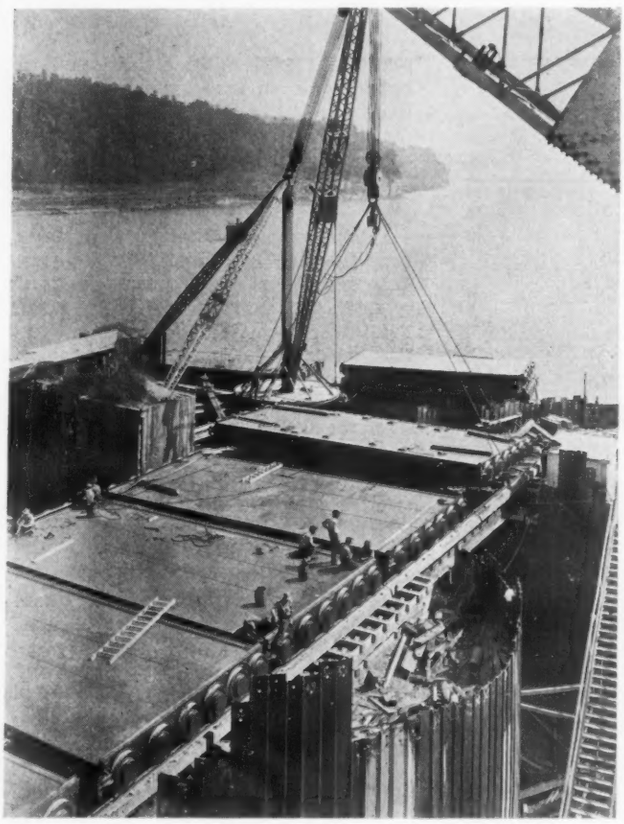
New tables include: For the United Kingdom, imported iron ore consumed in the production of pig iron and ferroalloys, by district of consumption and country of consignment, 1937; materials consumed in the production of pig iron and ferroalloys, by district, 1937; materials consumed in the production of steel ingots and castings, by district, 1937; imports of iron and steel scrap, by port of entry, 1929, 1934-37; exports of iron and steel scrap, by port of departure, 1929, 1934-37; Brazil, production of pig iron, steel ingots and castings, and rolled iron and steel products, 1925, 1930, 1933-37; imports of iron and steel, by product and country of consignment, 1936; imports of iron and steel, by product, 1929, 1933-36; Czechoslovakia, imports of iron and steel, by product and country of consignment, 1937; Canada, exports of iron and steel, by product, 1929, 1934-37; exports of iron and steel, by product and country of destination, 1937.

A new feature of the United Kingdom division of the tariff section is a resume of the duty changes on the principal products and of government papers affecting the steel industry, from 1932 to date. The usual information is given regarding import duties on iron and steel in force in the United Kingdom and foreign countries.

Handling Lock Gates

■ THE HANDLING and placing of large spillway gates weighing as much as 200 tons apiece has developed into a well defined series of operations graphically portrayed in the accompanying views. The efficient handling method described and illustrated here was planned by George P. Jessop, T.V.A. construction superintendent at the Guntersville Dam, Guntersville, Ala. Photos courtesy Dravo Corp., Pittsburgh.

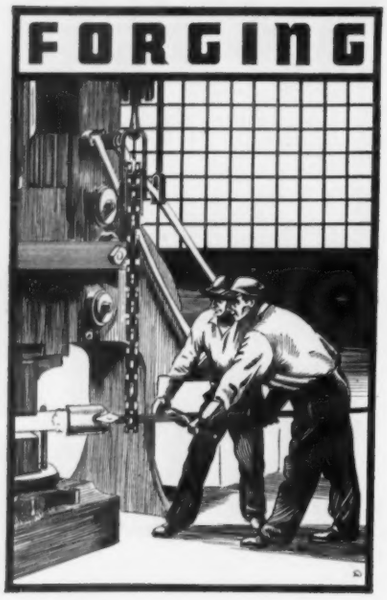
Above, eight gates are shown at right end, resting on latches in temporary position, their lower edge visible below deck of spillway. These gates were fabricated and assembled by Dravo Corp. at its Neville Island plant



Above, lifting beam of the permanent operating crane is attached to the top side of gate, which is then rotated into vertical position. Pier nose is temporarily omitted so gate may enter slot. After gate is raised to clear spillway deck, crane carries it to proper slot, deposits it on latches

Above, transfer runway, with parallel tracks set to the span of the gate wheels, extends from the face of the cofferdam to the upstream face of the dam. As the gates are moved along the runway, workmen bolt on the rubber seal strips. These are fitted in place as a last operation to avoid possible damage in transit. Gate is then rolled to a point where it can be picked up by the permanent gate-operating crane on the spillway

Right, at the end of a 1292-mile water journey from the Dravo Corp. plant near Pittsburgh, these 19 spillway gates, weighing about 1900 tons, arrive at Guntersville Dam



Enlarges Axle Plant

Specializing in axle production since 1885, plant develops advanced forging practices and controls resulting in precision forgings that approach rough-turned parts in accuracy

By E. F. KENNEY
Metallurgical Engineer
Bethlehem Steel Co.

■ FUNDAMENTAL technique of axle manufacture as known today largely had its inception in what is now the Johnstown, Pa., plant of Bethlehem Steel Co. where a large expansion and modernization program has recently been completed.

New equipment includes an additional forging hammer, two up-to-date heat-treating furnaces and a charging machine. An efficient, modern, axle finishing shop has been built and equipped with a number of new cutting-off machines and lathes.

This plant makes all standard and special types of axles for locomotives, passenger and freight cars, street railway and mine cars; armature shafts for electric locomotives; crank pins and piston rods. Equipment also is available for overall grinding of special axles up to 16 inches diameter and for production of hollow axles. Rounds and special forgings are produced in lengths up to 126 inches and 13¼ inches diameter. Axles and rounds can be forged to a tolerance approaching that of rough-turned parts.

Axle blooms are rolled in the Franklin division of the Cambria plant, cut to length, conditioned to remove all surface defects and delivered to storage yard at the axle plant. All axle blooms are control cooled to insure slow and uniform cooling, thus minimizing the danger of setting up internal stresses.

Blooms are delivered from storage beds by overhead crane to a heating furnace with 580 square feet of hearth area, fired with 525 B.t.u. coke oven gas. Five burners are arranged across front of furnace; flames pass over the steel to a flue in the back. Forging temperatures are regulated by pyrometer readings. Blooms are placed on skid rails at the charging end and pushed into the furnace, one at the time, with a hydraulic pusher. As one bloom enters the furnace a heated bloom is ejected at the opposite end.

Heated blooms discharged from the furnace are rolled to desired diameters, and immediately transferred to the hammers by tongs and monorail. Three hammers are available for forging standard axles, one 10,000-pound and two 8000-pound units, all equipped with double groove dies, one groove for journal and dust guard and one tapered groove for the barrel. The latter groove is made one-half the length of the barrel, which makes it possible to forge a tapered barrel of excellent contour. This system of forging originated at the Cambria plant and is in a large measure responsible for the high quality and fine workmanship developed here.

First one end of the axle is finished forged, then it is turned around and the other half is completed. Forging is placed on a 60-

Inspecting axles on shipping bed. A carefully designed floodlighting system is an aid in this work

foot cooling bed, and when still at a dull red heat it is straightened in a special press. Heat treatment or slow-cooling operations then follow, after which the axle is machined.

Driving axles and special items are forged directly from the heated bloom on either a 10,000-pound or a 15,000-pound hammer, without rolling in the round mill. A special heating furnace with 252 square feet hearth area is used for these products. It is fired with coke oven gas from three burners at one end and with the flue arranged so the flame is well distributed. Temperatures are pyrometer controlled. Blooms are charged and removed from the heating furnace with a charging machine shown in one of the illustrations. It permits rapid handling of the heated bloom with negligible heat loss. Thus most of the heaviest pieces can be forged in one operation without reheating, important for quality.

Alloy steels and high carbon steels are always charged on a cold hearth. To prevent internal rupture from cooling stresses, these forgings are either control cooled or placed in one of the heat-treating furnaces and cooled down slowly to a safe temperature. Most items are machined directly after forging. However, practically all alloy steel axles and many special forgings call for heat treatment.

Full Automatic Control Used

The two heat-treating furnaces, each with 443 square feet of hearth area, are heated with coke oven gas and have full automatic control with pyrometer regulation in each heating zone. Heat is supplied by two rows of burners, 14 on one side and 13 on the other, arranged so flame does not directly contact the steel.

Heat treatment of a charge considers both grain size and physical properties desired. Treatment selected may be one of three types:

When annealing, cold forgings are first heated to the predetermined temperature for refinement of the structure and after soaking are cooled down in the furnace to well below the critical point after which they are removed from the furnace and placed on a cooling bed.

In normalizing, the cold forgings are first heated to the predetermined temperature. After soaking they are pulled out of the furnace and allowed to cool in the air, and are kept well separated so they do not touch each other at any point. They are taken down almost to room temperature and then returned to the furnace where they are slowly brought up to the proper drawing temperature. After thorough soaking at this temperature they are cooled down with the furnace and finally placed on a cooling bed.

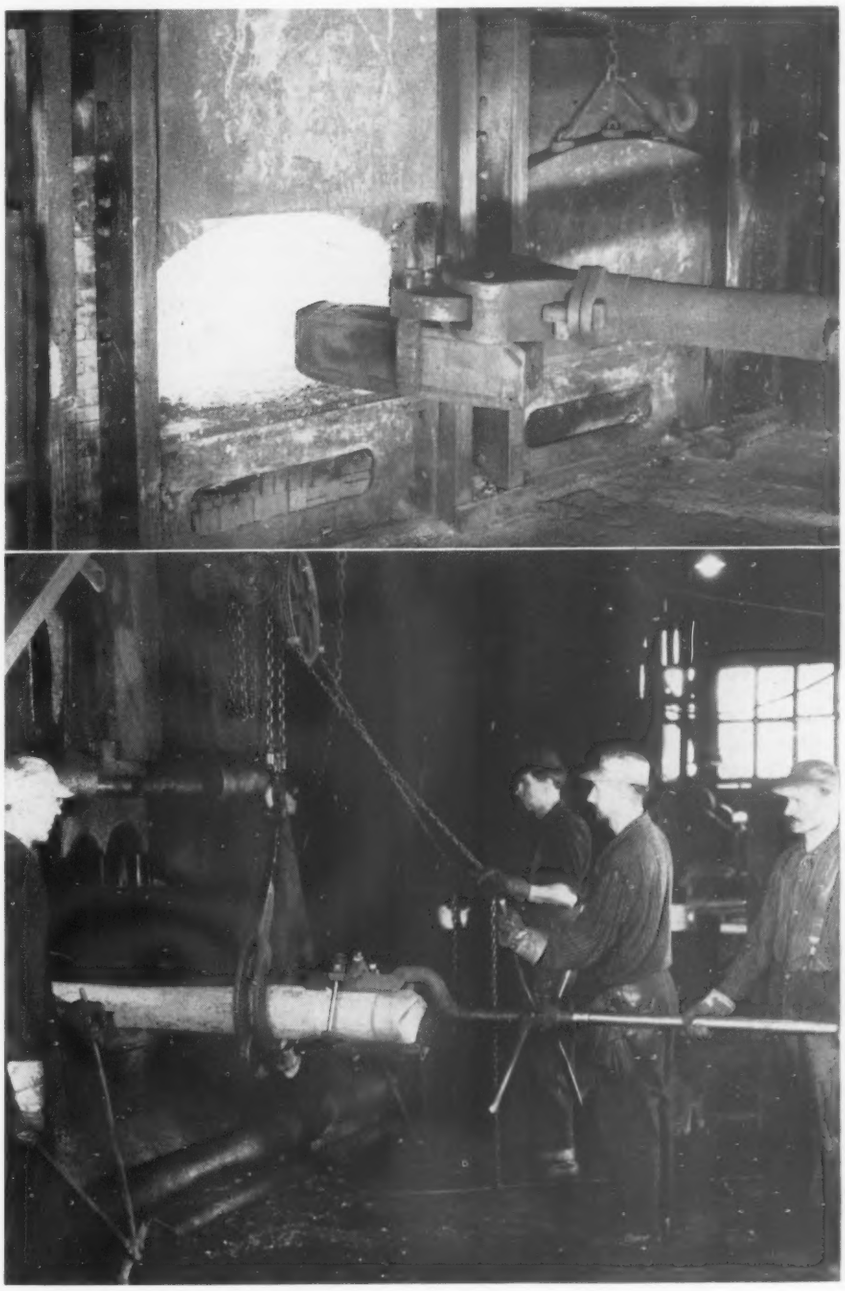
Quenching procedure is the same as used in normalizing, up to the point where the forgings are removed from the furnace. Then they are quenched in water or oil, immediately recharged to the drawing furnace, heated slowly, soaked, cooled down with the furnace and finished on a cooling bed.

Temperatures used are governed by analysis of the steel and the specifications. In all cases gradual heating is observed. Forgings are soaked thoroughly, allowing about one hour per inch diameter. A proper flame is used to prevent excessive scaling of the axle's surface.

Heat-treating furnaces are charged with overhead crane; the forgings roll on cast iron skids down the slightly inclined hearth toward the front of the furnace. Here they are pulled out with long hooks.

Quench tank is arranged immediately in front of the furnace. The axles are dropped, one at the time, on revolving rollers which are lowered into the quenching fluid. Revolving the forgings as they go into the quench gives uniform cooling with minimum stresses and insures straighter axles. Forgings are kept revolving during immersion, and quenching medium is agitated by a circulating system.

Forgings go from forge shop or heat treating department to a stock yard of 1500 tons capacity, served by



Charging of cold blooms into heating furnace is shown above. Close-up of hammer crew forging 6 x 11 axle, below

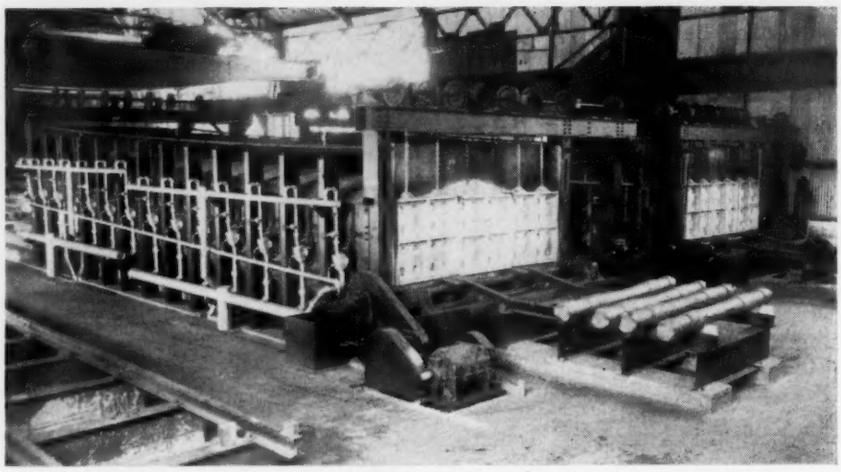
two overhead cranes. From here they are loaded on transfer stock beds and taken into the finishing building by electric car pullers.

An outstanding feature in the layout of the finishing building is the arrangement of the machines in parallel rows the full length of the building; first a row of cutting-off and centering machines, then the journaling lathes, then the shipping bed and finally the end-driven lathes. Electric hoists on monorails run above each machine the full width of the building. This arrangement permits continuous, straight-line processing of the forgings as they move from one machine to the next. Thus chances for delays and mix-ups are minimized. One crane serves the shipping beds.

Axles are first cut to length in 13 cutting-off and centering machines, four large machines for special work and nine smaller ones for standard axles. The former have two cutting tools at each end, giving a good end surface. Speed of cutting heads in the new type machines is rheostat controlled to maintain constant cutting rate with increasing depth of cut.

As soon as ends are cut off, axles are centered with 60 degrees, standard, center holes and transferred to the center-driven lathes for machining journals, dust guards and wheel seats. These lathes are placed at a slight angle to the monorail track to permit entering the work with the hoist. A slow feed is used to prevent tearing of the surface, thus insuring a smoother finish in final machining. Lathes have dual tools at both ends which make it possible to use the finer feed without sacrifice in production.

When no further machining is required, axles are taken to the shipping bed. If a rough-turned all-over job is required, they go to the end-driven lathes. After machining the barrel, they are placed on the shipping bed.



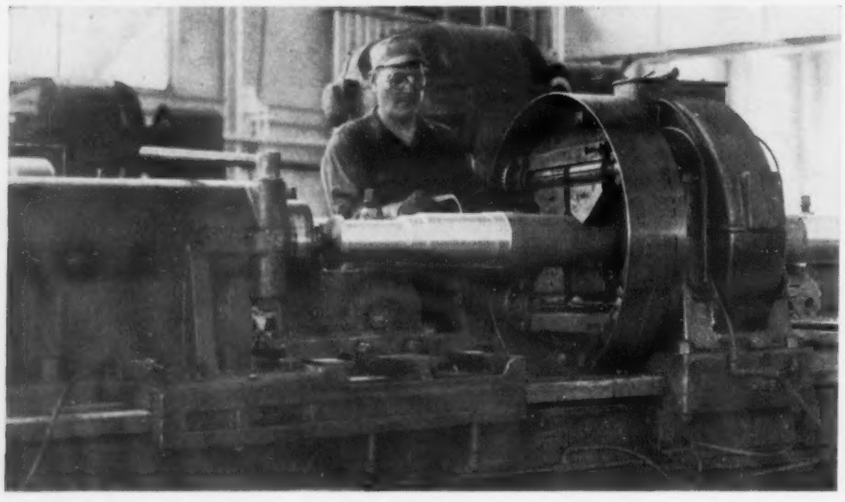
Discharging end of heat treating furnaces showing rails on which axles are moved ready for pickup by the crane

Additional finishing equipment includes a grinding machine for overall grinding of axles for high speed passenger cars, and three boring mills capable of boring holes up to 6 inches diameter, 126 inches long. All lathes and the grinder are equipped with revolving ball-bearing centers to preserve a true center for the final machining, an important improvement which originated in this plant.

In addition to crane and hoists, a gasoline-driven forked lift truck is used for handling stock and for removing steel turnings from scrap boxes. All products leaving the shop are carefully inspected on the shipping bed. Large flood lights above the shipping beds facilitate examination. Inspectors report directly to the metallurgical department and are not under the supervision of the operating personnel.

Testing equipment makes standard drop tests. Each tempering charge for heat treated axles also receives a tensile test, microscopic examination and frequently other tests are specified. In such cases, at least 20 per cent of the forgings are made with test prolongation. Two coupons are taken from the end of each axle selected for test, one coupon for preliminary tests in the plant, the other for final and official laboratory tests.

Center-driven cutting-off machine, one of several special machines here



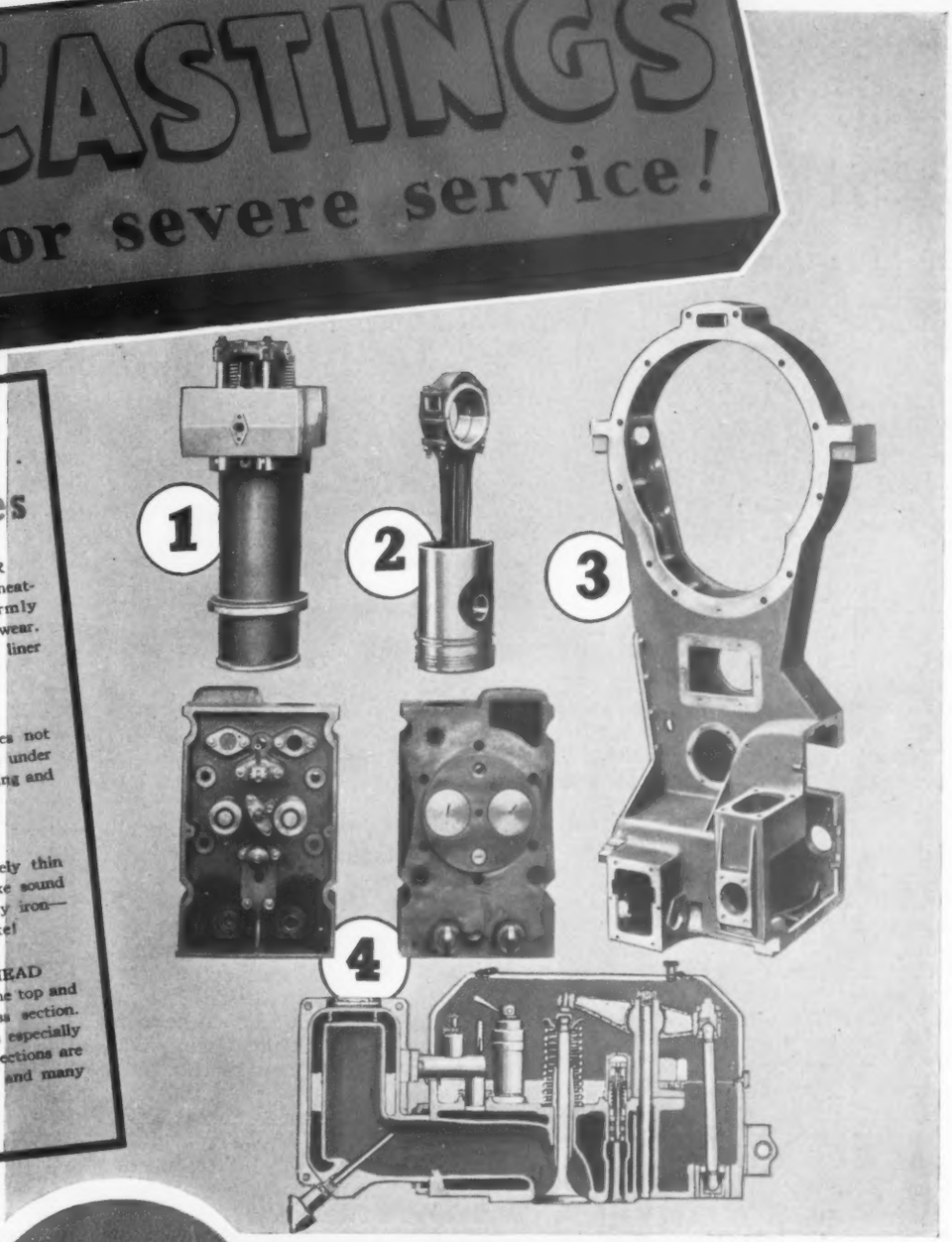
German Handbook On Hardness Testing

■ *Gmelins Handbuch der anorganischen Chemie, Eisen, Teil C—Lieferung* 1, (Gmelins Inorganic Chemistry Handbook, Iron, Part C, Section 1), edited by the German Chemical society; paper, 162 pages, 7 x 10 inches; published by Verlag Chemie, Berlin, Germany; supplied by STEEL, Cleveland; in Europe by Penton Publishing Co. Ltd., 416-17 Caxton House, Westminster, London.

This book, which is published in German, is another section comprising a monumental work on inorganic chemistry. This relates to hardness testing methods for iron and steel. It is divided into numerous parts covering all methods for hardness testing. The first discusses scratch hardness methods and the second describes static indentation. That is followed by information on dynamic hardness testing. Another section deals with pendulum hardness testing and another with special hardness testing methods.

Other phases covered in the book relate to hardness determinations on special materials, determining hardness at high and low temperatures, hardness testing machines, relation of hardness values to one another, relation between hardness and tensile strengths, relation between hardness and elastic limit, relation between hardness and mechanical properties, and a critical review of commonly used hardness testing methods.

CASTINGS for severe service!



Look at these examples

1 POWER-CYLINDER LINER
Cast with Meehanite, then heat-treated. Structure is uniformly dense, yet machinable. Resists wear. Not subject to distortion; liner stays round.

2 POWER PISTON
Made of Meehanite, it does not "grow," as gray iron does, under conditions of alternate heating and cooling.

3 END HOUSING
Large in size; has relatively thin sections. Difficult to make sound and satisfactory with gray iron—but perfect with Meehanite!

4 POWER-CYLINDER HEAD
Illustrated at right are the top and bottom views, and cross section. Meehanite uniformity is especially important here, where sections are of different thicknesses and many cores are required.

Typical MEEHANITE advantages

- Accurately controlled physical properties guaranteed to a given specification.
- Complete absence of shrinkage and porosity at change of section.
- Freedom from crystal weakness and internal strain.
- Absence of galling or seizing under severe wear conditions.
- A homogeneous structure throughout all sections.
- Exceptional rigidity.
- Good machining qualities.

METAL MEEHANITE

For technical data, **CONSULT ANY OF THE FOUNDRIES LISTED BELOW**
or Meehanite Research Institute, Vandergrift Building, Pittsburgh, Pa.

MANUFACTURERS:

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Banner Iron Works . . . . . St. Louis, Mo.
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H. W. Butterworth & Sons Co. . . . . Bethayres, Pa.
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Cooper-Bessemer Corporation . . . . . Mt. Vernon, Ohio
M. H. Detrick Co. . . . . Peoria, Ill., Newark, N. J.
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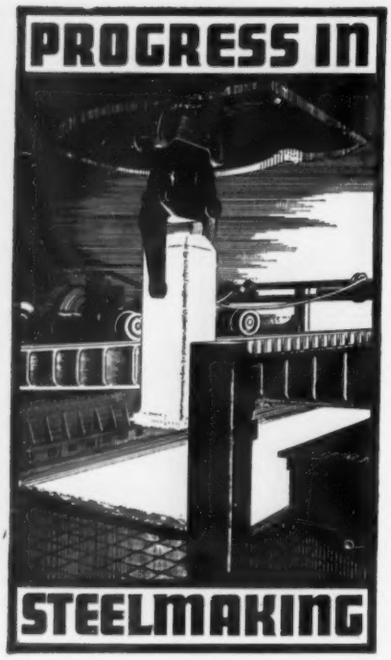

Instrument Firing

A modern installation of automatic open-hearth control is detailed, its operation described, characteristics of each instrument pointed out and actual results are listed

By E. T. W. BAILEY
Combustion Engineer
Steel Co. of Canada Ltd.
Hamilton, Ont.

■ IN THE past decade the steel industry has become increasingly instrument minded. More than ever, economy and adherence to closer specifications are demanded, and any tool that aids in attaining these objectives finds a ready acceptance.

Probably the most important special condition that pertains to open hearth furnaces is an unmeasurable rate of load. The fuel feed to a boiler can be controlled by a master regulator actuated from steam pressure. Other furnaces, such as heat treating and processing, are successfully controlled from the temperature. The open hearth furnace where refining and melting of steels are in process cannot be controlled from any such base. The best rate of fuel firing that can be used is that which is a maximum without damage to refractories.

Due to chemical reactions, during the process of making steel, neither furnace gas analysis nor absorption of heat by the bath remain anywhere nearly constant so instruments registering percentages of either oxygen or carbon dioxide in the furnace waste gases cannot transform them into automatic regulation impulses without continual supervision of an experienced operator.

Another difficulty is in continually and accurately measuring the unusually high furnace temperatures. Other difficulties also exist, varying with the type of fuels used and the design of the furnace.

Some attempts have been made to measure continuously the bath temperature. When this is satisfactorily accomplished, a new source of information and a possible temperature impulse may be created whereby some means of fuel control could be used to advantage.

A recent installation made at the Hamilton works of Steel Co. of Canada, Ltd., on No. 14 open hearth furnace may be considered a good example of use of automatic controls. The furnace, of the McKune type, was built primarily to use coke oven or mixed coke oven and blast furnace gas. In addition it is equipped with separate burners for auxiliary high pressure coke oven gas to reduce the time required to melt scrap. Gases are fed, cold, direct to the furnace ports, and all checker chambers are used to preheat air only. Checker chambers are completely steel encased—walls and roof tight and insulated. Adequate fans for handling air and waste gases are provided.

Two Types of Instruments

Instruments applied to this furnace may be divided into two classes: Instruments that indicate, record, or integrate, but do not control; and instruments that mainly control.

A record of the temperature of the fuels as they arrive at the furnace furnishes a means for making proper correction to the volume of fuel used, which in turn guarantees fair treatment. One such record for each fuel is usually sufficient for a whole shop. As there is more than one fuel, the temperature of each is recorded on a single chart by a two-pen instrument.

Records of gas pressures are combined on a single chart. If fuel fails to reach the furnace, the supply pressure recorded is first to check. It also furnishes a means of correcting volume measurements if pressure used is other than that for which the flow meter orifice was designed.

A record of flow of each gas to the furnace with a separate large indicator and a duplicate record with integration at the central plant panel are provided. The fuel flow meter is probably the most useful instrument that does not control. It shows that fuel is fed to both ends of the furnace at the same rate and the record gives the superintendent a reliable guide concerning what has taken place for the past 24 hours. Flow meter records enable proper fuel charges and B.t.u.-per-ton reports to be made.

A flow meter recording the volume of combustion air being supplied is not often used, but in our experience it is the only instrument that has been especially asked for by operators. It assures equal air flow to both ends of furnace. By a simple calculation, gross ratio of air to gas can be obtained. It also checks the air-gas ratio controller's performance. The chart obtained should be an exact duplicate of the gas chart with a slightly higher ratio of air during the period when combustible gases are being given off by the bath. The auxiliary high pressure gas meter usually measures the air flow as it is only em-

Abstract from paper presented at instrumentation conference, Carnegie Institute of Technology, Pittsburgh, October 13, 1938.

ployed on gas when highest production rates are being maintained.

A record of the pressures prevailing in the furnace is useful. If these instruments were placed on furnaces without automatic furnace pressure control, some surprising information would be obtained. The instruments are supersensitive and give a detailed record of minute changes in furnace pressure.

A six point potentiometer pyrometer records temperatures of gases leaving the four regenerator chambers as well as at inlet and outlet of waste heat boiler. The record provides a check on performance of the automatic temperature difference reversing controller.

When instruments are mounted on a panel, with complete furnace control centralized there as well, it has been the practice to include a large electric clock which enables operators to insert correct times in their operating records.

Of the instruments that control only, or may combine to control as well as indicate, record or integrate, the following are most important:

Air-gas ratio or combustion controller proportions the volume of air passing through the forced draft fan, to the volume of gas flowing into the furnace ports. It is argued that all the air that passes through the fan does not reach the furnace ports. Leakage past reversing dampers to the stack and from the regenerator chambers takes place and is not constant throughout a furnace campaign. Also the air volume needs to be increased during the period when large quantities of combustible gases are being given off by the bath. However, in our experience the advantages and savings made available by this controller on open hearths far outweighs its few shortcomings.

Air-Gas Ratio Indefinite

It is true that the air-gas ratio is not known for a given furnace and also that it changes and that the control, by itself, cannot correct for these changes. But, on the other hand, neither can an operator unless the change be most sudden or marked, which is not usually the case. By checking the analysis of the waste gases leaving the furnace at regular periods, the air-gas ratio can be reset on the control dial to hold the correct ratio of volumes and can do its job much better than any operator could do, even if he devoted his full time to that work.

By means of the ratio adjustment, air can be increased during the period when combustible gases are being given off by the bath. The control merely holds the ratio that tests indicate is needed. It is a tool that properly used will reduce fuel consumption as much as 500,000 B.t.u. per ton over manual operation. This was determined from two duplicate furnaces. For over two years, the furnace without control consistently averaged 500,000 B.t.u. per ton higher. When control was added, the results for both furnaces became almost identical over a considerable period of time. If one wishes to be further convinced of its value, place a flow meter to measure the volume of air to the furnace unknown to anyone else. Compare the chart with the gas chart and do the same on a furnace operating with the aid of a combustion controller. The results will be conclusive.

Combustion control on the particular furnace mentioned is of particular interest inasmuch as three fuels may be used separately or together in any proportion from low to maximum quantities, and the controllers function to give the correct amount of combustion air. Provision also is made to change the air-gas ratio by plus or minus 10 per cent from the set ratio to take care of desired atmospheric changes in the furnace.

Each fuel has a separate controller which operates from the same orifice plates that are used for the flow meters. All the fuel controllers, either separately or together, are arranged electrically to unbalance

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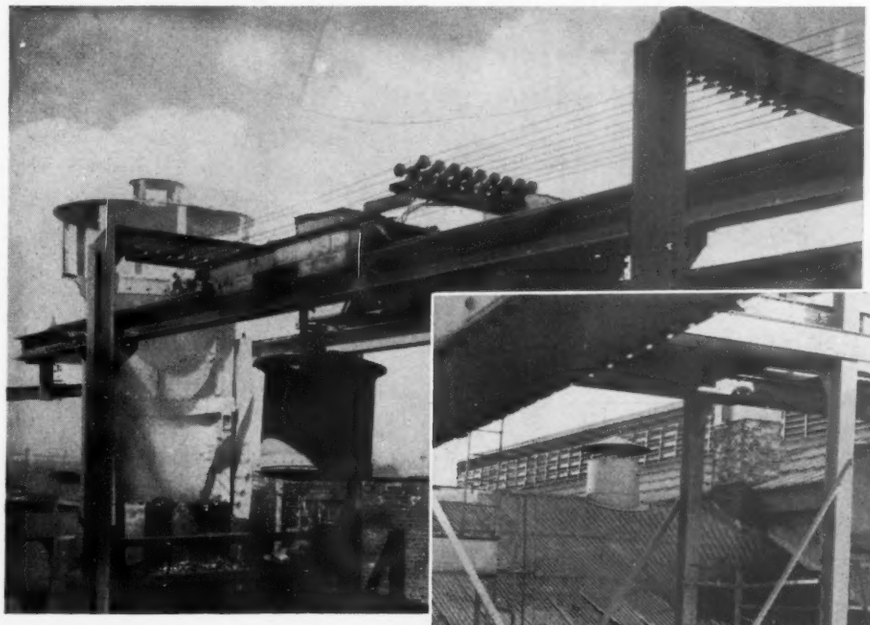
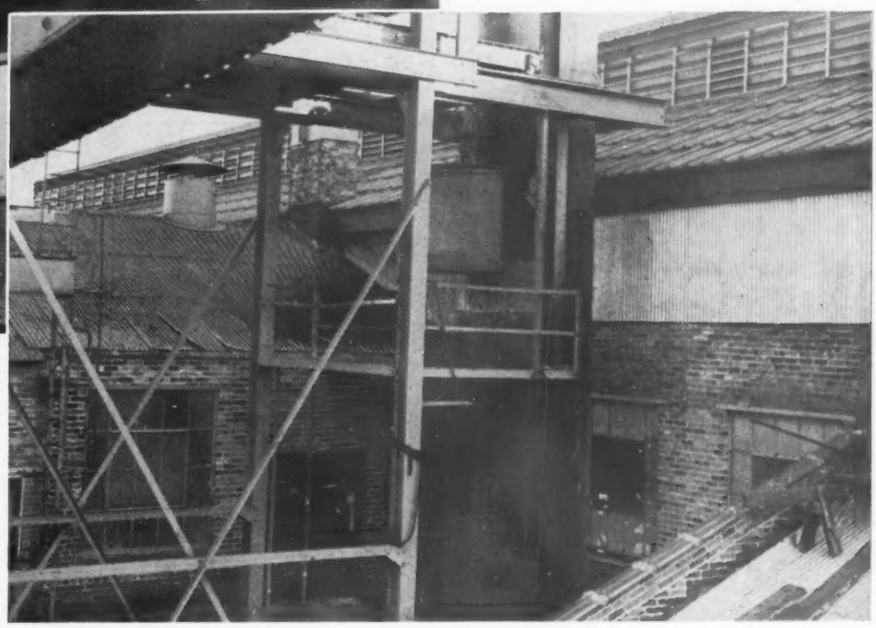
Chargers Serve Outdoor Cupolas





■ **Cupolas recently installed at a number of foundries are located outdoors. Equipped with horseshoe type wishbone chargers, they are served economically and without discomfort to operators due to changes with in the weather. Charger in installation shown at right is operated through remote control by the yard crane operator. Photos courtesy Whiting Corp., Harvey, Ill.**

Shrinkage Control

A large fabricator of welded steel structures details methods which give best results in avoiding or minimizing shrinkage due to welding. Type of joint shown important

By G. J. GIBSON
Welding Engineer
Pittsburgh-Des Moines Steel Co.
Pittsburgh

■ A WELD shrinks and so distorts steel members because the thermal expansion resulting from the steep temperature gradient produced by the arc exceeds the elastic resistance or yield point of surrounding metal. There are a number of well defined factors, careful control of which will do much to eliminate shrinkage. Although the following recommendations apply particularly to butt joints, the same principles pertain to fillet welds. These rules can be summed up in the following paragraphs.

Use smallest amount of weld metal possible. Use smallest groove that will permit the desired penetration. Practical limits for field welding are 60 degrees vee with a 3/32 to ⅛-inch root spacing for complete penetration.

Use electrodes which require the least heat per unit of weld deposited within limits that will produce acceptable weld metal.

Preferably employ methods or electrodes which produce the most deposited weld metal per unit of time. This may be accomplished by high welding currents, large electrode diameters, or selecting an electrode with high melting speed and small spatter loss.

Never permit a piece being welded to cool for a long period unless the weld is built up to the full plate thickness.

Shrinkage may be decreased somewhat by employing a partly fixed condition, obtained for instance by weights on tack welding. This may be particularly helpful in reducing angular distortion of plates at a joint.

Distribute heat over the length of the seam in welding structures of large proportions to reduce tendency of plates to dent and buckle. Start at center of long seams and weld toward each end using the step-back method. Distortion is easily reduced 15 per cent by step-back welding.

Wherever possible protect parts during and after welding until they are at room temperature. Avoiding drafts is particularly important in cold weather. Slow cooling permits even distribution of stresses and leaves time for the heat to soak evenly into the plate.

To prevent bending or angular change of plates, weld in such thick layers that the reverse side of the plate assumes a red heat during welding. Use some means of restriction against bending.

Since sequence of welding is all-important, allot this factor its deserved consideration. In general, weld all end connections of plates first and then the long seams between. Where transverse joints in shapes occur, weld these joints first and then weld the shapes to the plate using intermittent fillet welds where possible as these cause only slight shrinkage.

As longitudinal shrinkage is uniform and far less than concentrated shrinkage across a welded joint. Hence, it will serve as a guide in setting up correct sequence of erection if it will be remembered that

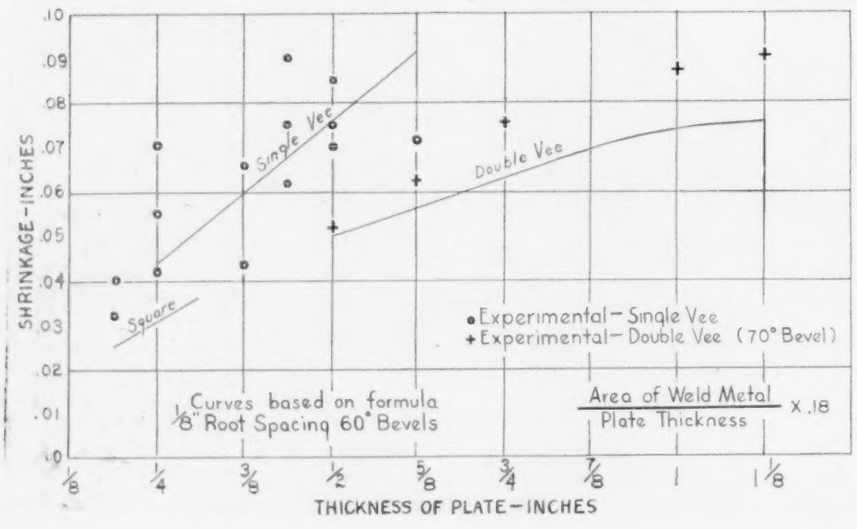


Fig. 1—Curves showing amount of shrinkage perpendicular to weld (transverse shrink) for various plate thicknesses and for different types of buttwelded joints

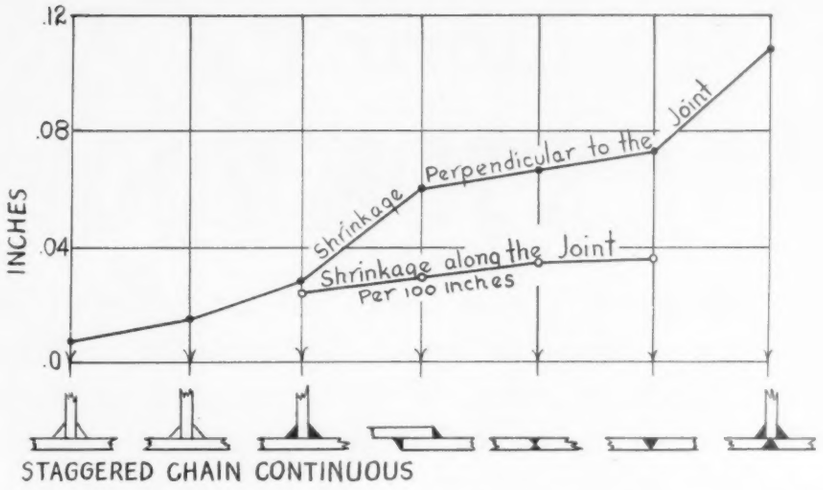


Fig. 2—Shrinkage is influenced greatly by type of joint as is shown here

while parts still have freedom to move, those joints which cause the greatest shrinkage should be welded first, with joints causing least shrinkage welded last.

Proper peening is effective in reducing shrinkage of multiple bead welds. Cold peening is particularly effective in reducing shrinkage stresses when the plates being welded are restrained. In unrestrained plates, hot peening immediately after welding is easier and just as effective. Each period or layer should be peened over its entire surface using rapid, light blows so metal will flow smoothly. Heavy blows tend to tear or rupture the weld metal. For maximum effectiveness a blunt nose peening tool is recommended, peening down the ripples of each bead until the surface is smooth. Of course all prominent cavities and projections which might cause overlaps should first be chipped out.

While the factors and recommendations enumerated above are necessarily of a rather general nature, a study of them will undoubtedly be of value in controlling shrinkage.

Fig. 1 indicates approximate shrinkage of standard 100 per cent joints for unrestrained or free plates which is the case in most tank work. The curves were plotted from the following formula which is based on the thermo factors considering both shrinkage of plate and weld metal:

$$S = 0.18A/T$$

Here S is shrinkage in inches, A sectional area of weld including reinforcement in square inches, T is thickness of plate in inches and 0.18 is a constant for all free butt joints. This formula applies to square, single vee, double vee and U joints. Shrinkage of any joint not included in the chart, Fig. 1, can easily be computed. Peening will probably reduce shrinkage about 20 per cent. These curves represent the average of available experimental data which varied considerably with the welding procedure used.

Transverse shrinkage or pulling together of lap joined plates by fillet welds is not as important as shrinkage of butt joints because the lap can be adjusted to take up accumulated shrinkage.

Available data on shrinkage of lap joints is quite limited, amounts varying from 1/32 to 1/16-inch depending on thickness of plate, usually being experienced. The chart, Fig. 2, illustrates relative shrinkage of different types of joints and may be helpful in studying fabrications where some choice is available.

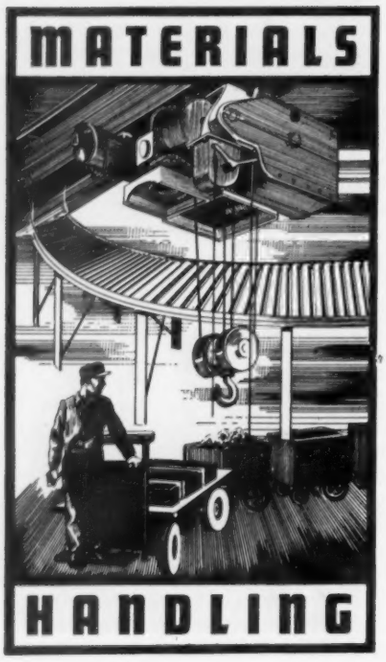
Longitudinal shrinkage along a welded joint, since it is uniform and much less in degree than across a joint, is much less troublesome. Shrinkage per unit of length in long seams appears to be a constant for butt, lap and tee joints in plates between 3/16 and ½-inch in thickness. This constant is about 0.035 per cent over the length of the seam although actual shrinkage may be 100 per cent greater or 50 per cent less, depending on the type of joint. Intermittent welds will produce less shrinkage than continuous welds.

Angular distortion of the welds is influenced by not only those factors first listed but also by the following:

In butt welds, angular distortion increases with number of beads or layers, appears greatest in single vee welds, less in single U, and least in double vee and double U welds. It may be practically eliminated in the latter by welding alternately on both sides in multi-layer welding and can be controlled to a considerable extent by peening. In fillet welds angular distortion can be reduced by restraining the plates, by preheating and by suitably arranging sequence of welding.

Welds Glass to Metal

■ **This lathe setup, with multi-jet manifolds, is used in making metal-to-glass fused joints for X-ray apparatus. End of copper tube is machined to extreme thinness and heated in lathe to a bright red by combination of illuminating gas and oxygen. Glass tubing then is telescoped over copper and allowed to fuse to the metal, after which finished piece is flame-annealed, as shown above, to prevent strains. Any glass-metal combination can be fused provided melted glass will wet the metal. Photograph courtesy Westinghouse Electric & Mfg. Co., Pittsburgh**



Aids Pickling

Special 3-hoist crane unit on 97-foot runway handles racks of refrigerator parts through series of cleaning and pickling operations greatly facilitating work

By W. J. ALBRECHT
Bldg. Dept.
General Electric Co.
Erie, Pa.

■ A RATHER unusual setup employed at the Erie, Pa., plant of General Electric Co. has been found to facilitate operations in the porcelain enameling department. A specially equipped electric crane carries refrigerator parts through a cleaning and pickling cycle to prepare them for porcelain enameling which follows.

The two illustrations show opposite sides of this special unit which was handling a rack of inner liners for food compartment when the photos were taken. Many other parts, however, are treated by this equipment. A load space of 4 feet 9 inches x 13 x 5 feet in height is provided in the arrangement shown.

A complete cycle of operations involves the following 11 steps or functions: Load parts on rack; in first cleaner tank—time 8 minutes; in the second cleaner tank—time 8 minutes; rinse in hot water for 2 minutes; pickle in first sulphuric acid tank—time 8 minutes; pickle in second sulphuric acid tank, also for 8 minutes; a cold water rinse—time 2 minutes. Last four operations include a neutralizer bath for 8 minutes, a second neutralizer bath for similar period, 8 minutes in the dryer, and finally to the unloading station.

Interval Is 8 Minutes

This means that one finished load is delivered to the unloading station every 8 minutes. All tanks which require heat are warmed with steam coils. The dryer unit has an outside heating system with coils and blower arranged for recirculation.

In order to make it possible for one crane to handle all the lifts required in each 8-minute period, the crane was fitted with three electrolift, double drum, 2000 pound hoists. Each hoist operates a horizontal I-beam which carries hooks on its lower side to engage the racks. A vertical section is welded at both ends of each horizontal beam. Each

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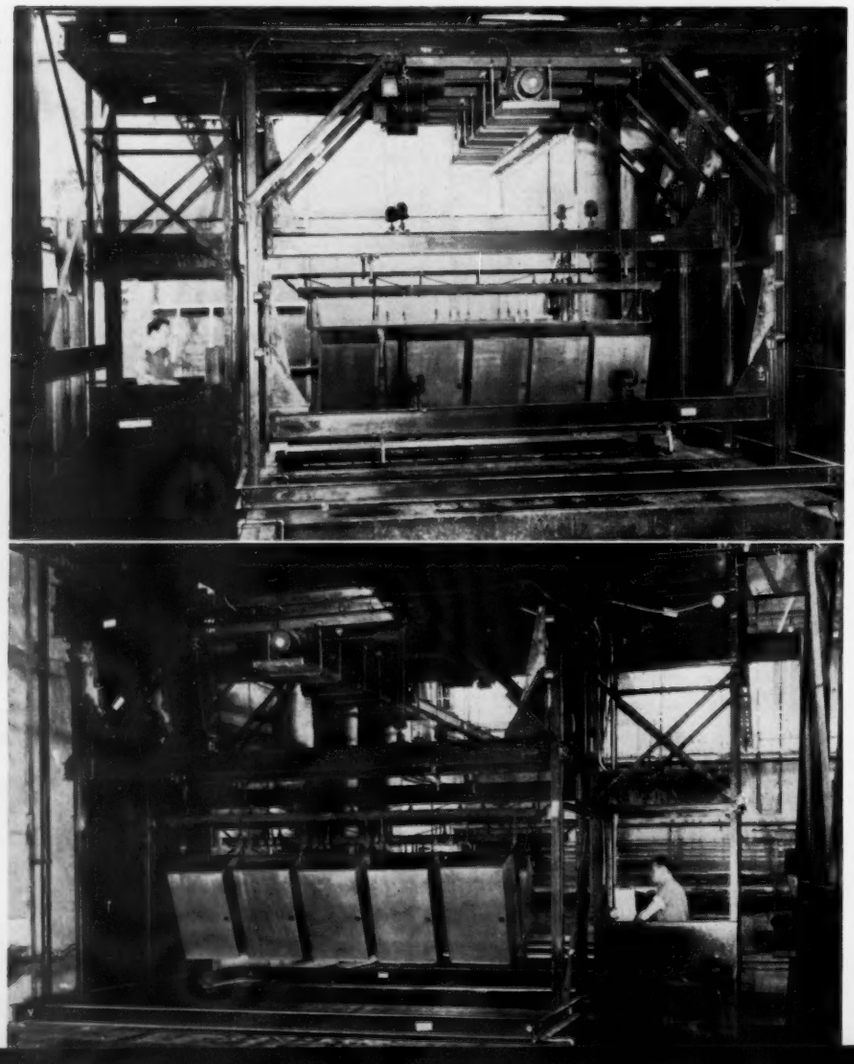
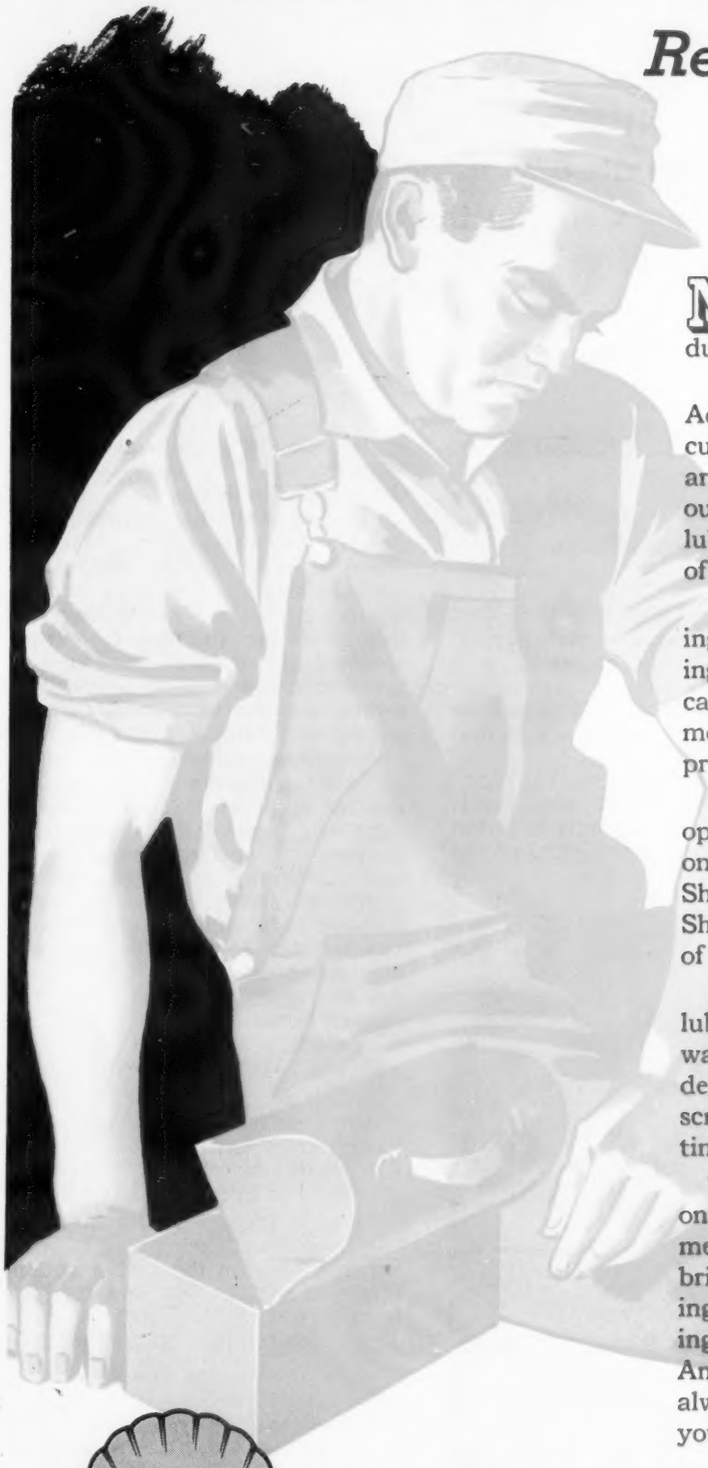


Opposite views of crane with 3-hoist mechanism. In top view, nearest hoist unit is lowered showing horizontal beam, vertical end sections and guide rollers. Transfer and lift unit just clears top of tanks

Their Forming Rolls Took

FOUR HOURS FOR LUNCH!



Read how Shell Cut Shutdowns to a Minimum

MEN OR MACHINES—you can't let them take 4 hours for lunch and keep production at par!

The Stubnitz-Greene Spring Corporation of Adrian, Michigan, manufactures automobile cushion springs and frames. Cushion frames are fabricated from strip steel passing continuously through a series of forming rolls. Improper lubrication was keeping these rolls idle 20% of the time—more than 4 hours a day!

Foaming of the soluble oil in use was resulting in a great loss of lubricant through splashing. Insufficient lubricant in the emulsion was causing the strips to jam, and scrap losses were mounting. Shell was asked to help solve the problem.

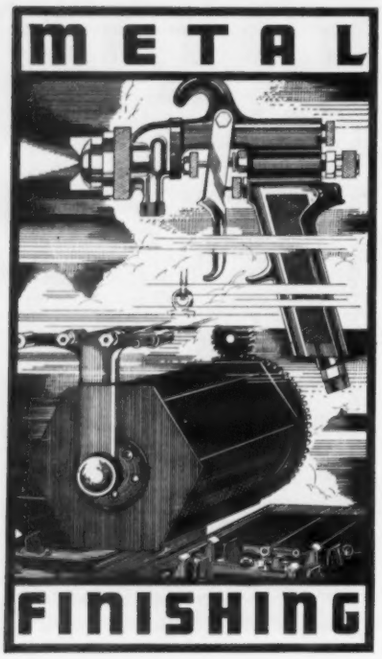
A complete survey of the machines and operating conditions was made. Then, drawing on their experience in the steel industry, the Shell engineers made their recommendation. A Shell Soluble Oil, with the proper proportion of water, was applied.

In use by Stubnitz-Greene for one year, this lubricant has a remarkable record. While easily washable from frames, it has shown no tendency to foam and has lubricated so well that scrap loss has been minimized and "down" time of the machines reduced to an all-time low.

This problem, solved so completely, is just one of thousands of successes for Shell in meeting the tough problems of industrial lubrication. Shell applies to *your* problem the ingenuity and resourcefulness gained from solving countless lubrication problems in every American industry. This *plus* in lubrication is always available to you. Simply call or write your nearest Shell office.

SHELL

SHELL *STEEL MILL* LUBRICANTS



Wear Resistance

Application of a phosphate treatment to metallic wearing surfaces effectively eliminates "scuffing" and greatly reduces wear on the treated surfaces

By W. H. SPENCER
Metallurgist
Sealed Power Corp.
Muskegon, Mich.

■ IN RECENT years, due to necessary mechanical changes in internal combustion engines, a wear condition known as "scuffing" has become a source of serious trouble. In piston rings, for example, a scuffed surface often has developed which was roughened and furrowed as shown in the lower part of Fig. 1. The normal wear loss of metal is exceeded greatly wherever this condition exists. Any cast iron or steel surface subjected to sliding or rolling friction under conditions of high pressure, high temperature, or scanty lubrication will be more or less scuffed.

Particular interest of Sealed Power Corp. was naturally in the effect of this type of wear on piston rings. It was found that a few hours' operation under scuffing conditions would cause as much damage to a ring as would several years of normal service.

This defect has been explained by some as abnormal wear for it has been observed not only in piston rings but also in other parts of the engine. Consequently, several theories have been advanced as to the cause of scuffing.

Research indicates the following causes of scuffing. Whenever two pieces of iron or steel are rubbed together conditions may be present which will cause welding or adhesion, and the subsequent tearing apart of the surfaces leaves rough spots to cause scuffing. In other words, scuffing is a mild case of galling or seizing.

Conditions necessary to bring about this adhesion of the surfaces are metal-to-metal contact, and a certain amount of pressure and temperature. Pressure and temperature are present in the engine and if the oil film between the metal surfaces fails, adhesion may follow. Temperature or pressure, or both, may cause the oil film to fail, and the consequent friction raises the surface temperature.

Vicious Circle

Thus is established a vicious circle of cause and effect. As a check of the theory, tests have been run in the absence of lubricant and in all cases scuffing was excessive.

Solution seemed to lie in maintaining a nonadhering and oil-bearing film between the surfaces. Confirmation of this idea was obtained from tests with rough finished cylinders which retained oil and bettered

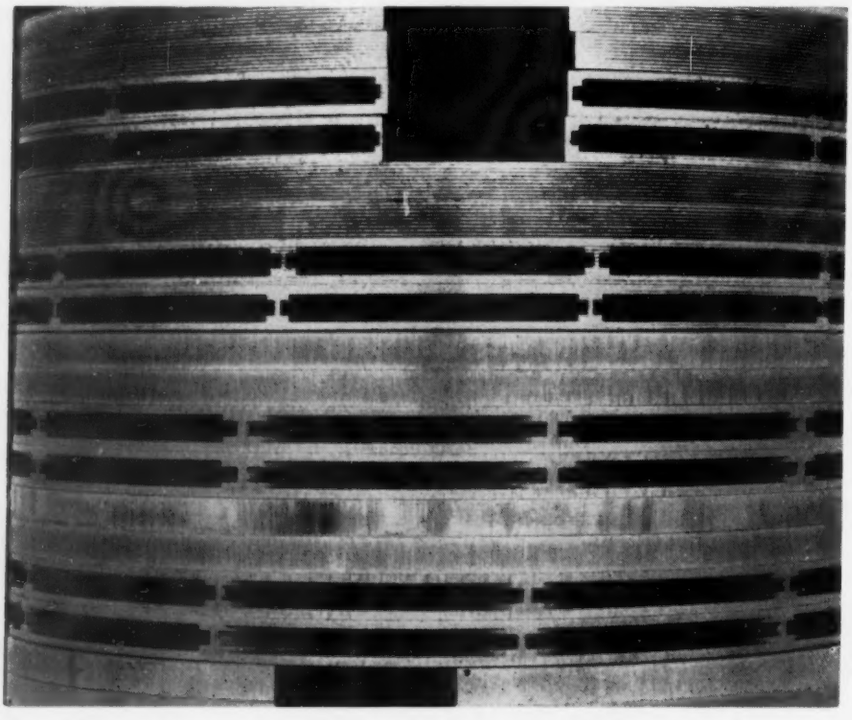


Fig. 1—Rings from one run in the same engine, in different pistons. Rings in upper half of stack here were Granosealed and still show longitudinal tool marks. Rings below were untreated. Here tool marks were worn away and scuffing has begun

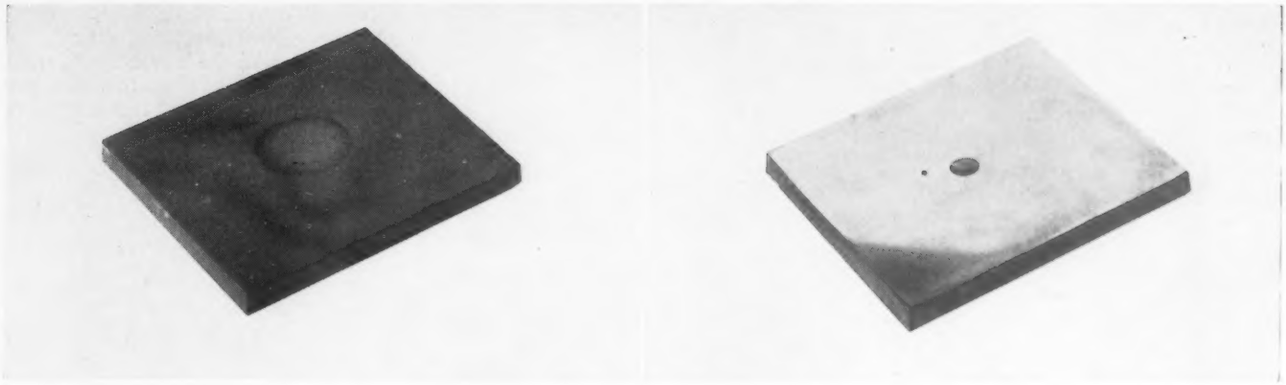


Fig. 2—Showing how a drop of oil spreads on a treated surface at left, and on an untreated surface at right

scuffing conditions. However, such cylinder finishes seemed impractical for other reasons. Further investigation showed scuffing to be present mostly in new engines. Surfaces worn in without scuffing in time developed a protective and oil retaining film and scuffing then was not a problem. Changes in the structure and constituents of the cast iron in the ring did not give a guarantee of freedom from scuffing. Incidentally, such changes were expensive and in some cases impractical.

Platings and Coatings Tried

As a preventive of scuffing, various nonferrous platings and coatings were tried. Results obtained were of little value. Nonferrous material would sometimes help a little, but cost was excessive and change in dimensions due to plating was a serious drawback.

It became necessary to find a material which would retain oil; remain on metal until the wearing surface was conditioned by use to hold its own oil film; not change the dimensions of the ring materially; and not be abrasive. The application of this surface further should not change the shape of the ring and should be inexpensive.

Some years before experiments had been made with a phosphate surfaced ring for corrosion resistance. This surface, being an unusually good oil carrier, was tried on piston rings for the prevention of scuffing. It met all of the requirements and the problem was solved. The process for phosphate treatment of rings has been called Granosealing, a name coined from the term Granodine, the name the American Chemical Paint Co. uses to identify one of its phosphate materials for surface treatment of iron and steel.

When a drop of oil is put on a polished untreated surface, either on a ring or cylinder wall, it spreads slowly, if it spreads at all. When the surface is wiped, most of the oil is removed. If a drop of oil is put on the phosphate treated surface, it spreads quickly and wiping does not remove it readily. Even an apparently dry treated surface will show oily when it is rubbed. The difference in the behavior of a drop of oil on untreated and treated surfaces is shown in Fig. 2.

Surface treatment of iron by this method is comparatively simple and does not involve the use of high temperature which might warp or distort the shape of the piston ring. The surface to be treated is first cleaned of oil and other matter by any good degreasing method. Ordinary gray iron or steel parts then are placed in the treatment bath. Hardened steel or chilled iron takes a better surface if it is etched in acid before being treated.

Treatment bath consists of diluted phosphoric acid containing manganese and saturated with iron. Iron is attacked by the acid but this action soon ceases due to the formation of a coating on the surface. The best strength for the solution is a matter of choice. Solution may be varied considerably. Length of time the iron remains in the solution before action ceases varies from 5 to 30 minutes depending on composition of the metal, strength of bath, and temperature of bath used for treatment.

For piston rings, the process employs a solution having about 2 per cent free acid, at a temperature of 210 degrees Fahr. Evolution of gas, which marks the progress of the process, ceases in approximately 10 minutes for a piston ring. Concentrated material for the preparation

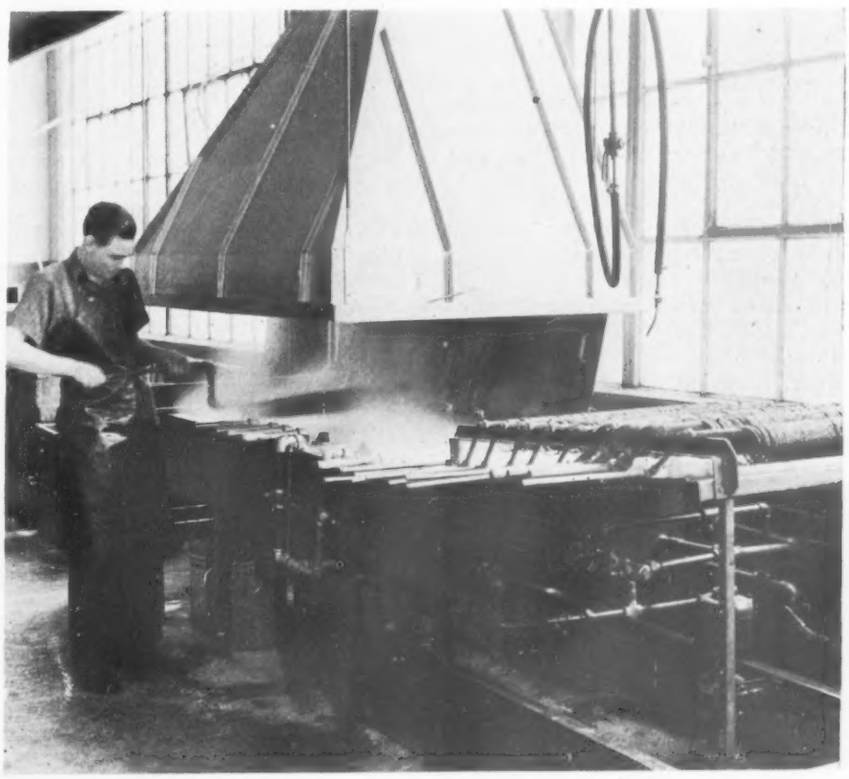


Fig. 3—Granosealing equipment for applying manganese phosphate coating to piston rings. Bath is held at 210 degrees Fahr. and rings are immersed in it for about 10 minutes

Table 1

Wear Test Results

Specimen	Test	Wear	
		Plain	Phosphate treated
Camshaft	One end treated, simulated hard service	0.0095-inch off major axis	0.0005-inch off major axis
Piston rings	Dynamometer tests in alternating cylinders, normal lubrication	0.015-inch gap change	0.003-inch gap change
Piston rings	In unlubricated motor	0.0135-inch gap change	0.0020-inch gap change
Ring size sections..	Dry wear test machine	0.0399-gram loss in weight	0.0037-gram loss in weight

of the bath may be purchased or prepared.

The part is removed from the treatment bath, washed in water and dipped into a soluble oil solution. It is blue-gray as it comes from the bath and black after oiling. The oil not only gives an improved appearance but also seems to add considerably to the value of the coating. The rings are allowed to drip to remove excess oil solution and then are ready for shipment or use.

Change in dimensions of the part during treatment may be controlled so metal dissolved is replaced or a slight build-up may be obtained. In service the treated metal rubs down to give a polished surface which is still oil retaining.

Thickness of the phosphate coating on rings can be varied by changing methods of application. The minimum amount of coating ordinarily employed is in the neighborhood of 0.00025-inch and it may exceed this amount considerably.

Hardness of the coating is difficult to indicate with exact figures. This is due to the difficulty of measuring the hardness of such a surface. It has no feeling of roughness or hardness when rubbed with the finger nail or with a metallic instrument. The surface rubs down giving a polish with a metallic appearing finish.

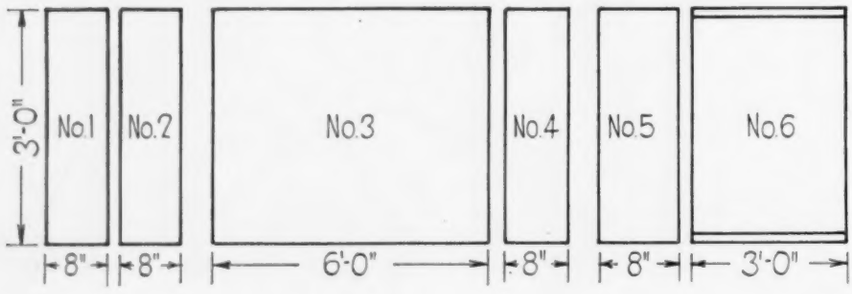
Rings may be handled through processing baths either manually or may be carried through by means of a continuous chain which supports the rings on crossbars. Number of rings in a treating bath at a time depends on size of bath container and varies accordingly. Unit shown in the accompanying diagram, Fig. 4, will process around 50,000 automotive-size piston rings in an 8-hour shift.

Bath may be heated in any convenient manner; the unit used here employs steam. Solution is kept up to strength by additions of new concentrated material from time to time, excess sediment being removed from bottom of tank. Renewing of the old bath is not required at any one time. Amount of new solution added is governed by the number of square inches of surface treated. Periodical tests are made to maintain the strength of the bath, while a routine test determines the percentage of free acid present and is usually sufficient. However, a second test for manganese content is occasionally necessary.

It is not claimed that this treatment will prevent scoring due to faulty cooling of the engine or to distortion of the cylinder. It does, however, prevent the scuffing condition found in new engines during the wearing-in or conditioning period of the engine. In applications where scuffing conditions are not present, the treatment reduces the amount of wear.

Besides piston rings such parts as cylinders, sleeves, pistons, camshafts, gears, pump impellers, tappets and others have been treated with beneficial results. In fact this treatment will be used by several manufacturers of automobiles for camshafts, tappets and other parts in new models this year.

Fig. 4—Steps in Granoseal process: cleaning solution, 140 degrees Fahr. (1); 140-degree Fahr. water rinse (2); immersion in boiling Granoseal solution (3); time varying with volume of unit, 10 to 15 minutes for auto piston rings, 20 to 30 minutes for pistons and camshafts; 140-degree water rinse (4); soluble oil dip (5); and to drying rack (6)



Metal Coloring Treated In Comprehensive Way

■ *Metal Coloring and Finishing,* by Hugo Krause, consulting chemist to metal finishing industry; fabrikoid, 222 pages, 6 x 9 inches; published by Chemical Publishing Co. of New York Inc., New York; supplied by STEEL, for $5; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London, S.W.1.

An authorized translation of the second German edition, the volume discusses from theoretical and practical applications and patent angles the subject of metal coloring by chemical, mechanical and electrical methods. The latter is divided into cathodic and anodic procedures.

The author attempts to relate all the important methods applied to iron and steel and the base and noble metals in their sheet, cast, mechanically fabricated and electroplated forms.

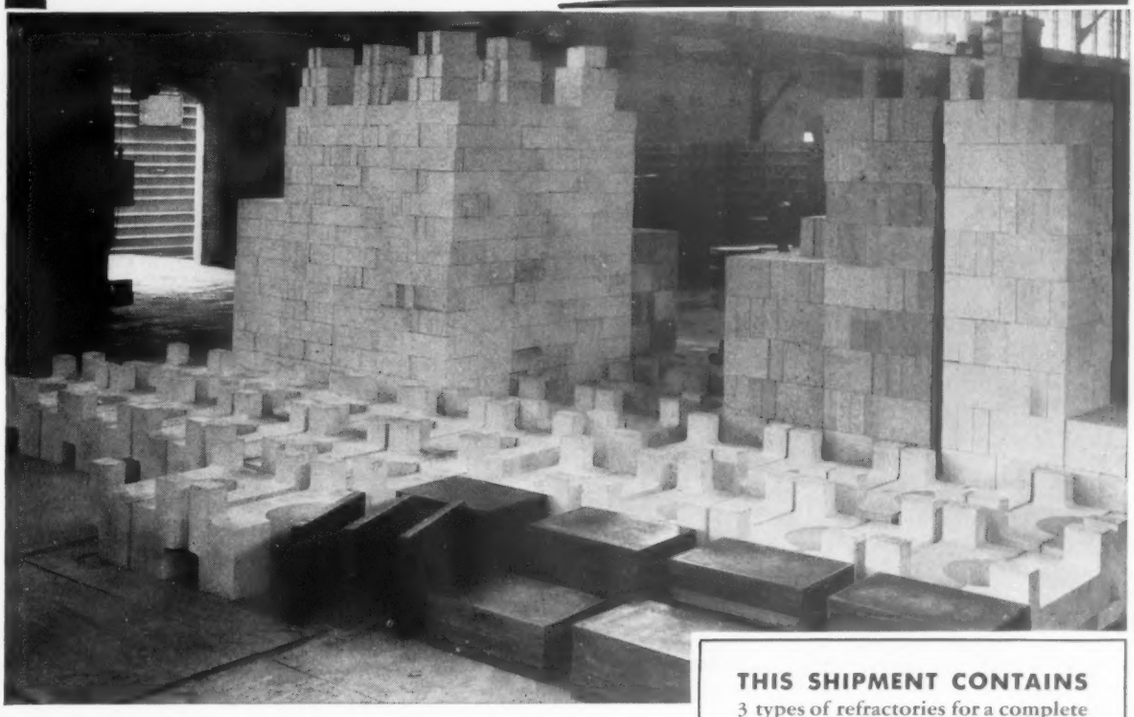
It is comprehensive and forms a reference and guide book to those engaged in metal coloring in its decorative as well as protective phases. Many of the so-called secret processes of the electroplating art are described in much detail, with critical comments by the author. American practices are given considerable attention. A brief but inclusive index aids in reference to the various subjects.

Manufacturers' Standard Practices Are Revised

■ Association of American Steel Manufacturers Technical Committees, 616 Investment building, Pittsburgh, has made revisions in two of its manufacturers standard practices. One of these is "Standard Permissible Variations for Dimensions and Workmanship of Hot-Rolled Steel Bars, Dimensions and Weight of Bar-Size Shapes and Weight of Concrete Reinforcement Bars."

The other is "Standard Permissible Variations for Dimensions and Workmanship Rectangular and Circular Sheared and Universal Mill Plates and Floor Plates; Also Standard Permissible Variations for Dimensions and Workmanship, Standard Structural Sections and Wide Flange Structural Sections." It should be noted especially that the material on structural shapes and flange beams is added to the pamphlet on plates.

HOW ONE MANUFACTURER PROFITED FROM CARBORUNDUM'S WIDE RANGE OF SUPER REFRACTORIES



One manufacturer's recent purchase of Carborundum Brand super refractories is an excellent example of the way this complete line can be of real benefit to industry. One shipment contained the three types of refractories listed at the right.

This manufacturer was able to get exactly the right refractory for each particular requirement. This meant a saving on fuel and operating costs. They also made extra savings in time because everything came in one shipment. There was no delay in construction, no undue hold ups in production.

In addition to the refractories listed here, Carborundum offers a wide selection of fused alumina and fused cast refractories. With such a group of refractories to choose from and with the experience gained in over 25 years of development in the refractory field, The Carborundum Company is the logical source of supply for refractory materials. Write our nearest office for a representative.

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3 types of refractories for a complete hot zone installation in a continuous porcelain enamel furnace.

"CARBOFRAX" (Silicon Carbide) tile for the hearth where high refractoriness, high thermal conductivity is required.

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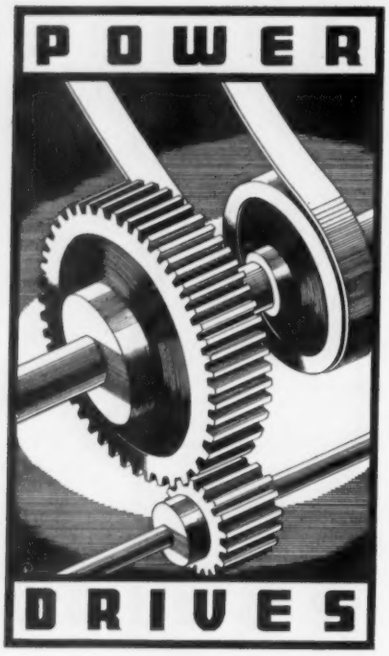


Modernized Drive

Substitution of gearmotor drive for open gearing produces power saving of 10.5 per cent, reduces floor area required by 45.7 per cent and improves working conditions

By S. B. BRITTAIN

Gearing Division
Westinghouse Electric & Mfg. Co.
Detroit

■ THROUGHOUT a rather large percentage of processing plants in the industrial field, there is yet today a surprising number of antiquated drives. Many of these prime movers are not only inefficient but also have many other disadvantages. Safety, dependability, space requirements and quietness of operation are factors of importance in modernizing a drive.

When Michigan Seamless Tube Co., South Lyons, Mich., recently modernized several drives, it was faced with a "maze" of open gearing on several large draw bench equipments. Fig. 2 shows gearing on the two speed train of the chain draw bench known as No. 7-8. It is enclosed by a wooden framework and has wooden "A" frames, Fig. 3, which serve as a "stand-by" aid in making the too frequent emergency repairs of broken gears and shafts or worn bearings. Noise from this equipment is bearable only by use of a nonmetallic high-speed pinion. Despite various barriers, heavy lubricating oil is thrown into aisles and causes a hazard to motor insulation.

Modernize with Gearmotors

Fig. 1 shows the same type of benches after modernizing with gearmotors. These are benches Nos. 3-4 and 5-6. Due to the extremely slow head shaft speed, it became most practical to retain and enclose the existing bull gears and pinions. The gearmotors are coupled to the pinion shafts.

Benches shown in Fig. 1 are equipped with 50-horsepower, splash-proof, Class II, linestart, high-torque, gearmotors which operate at 1160 revolutions per minute to give an output speed of 36 revolutions per minute. They are provided with additional electrical protection in the form of a bi-metal thermostat which has prevented several possible "burn-outs" by opening the control circuits at times when too frequent starting or some other condition has raised operating temperature abnormally.

In the case of bench No. 1, the purchase of a speed reducer was definitely the proper procedure, as the demand for standard gearmotors of this size (100 horsepower) has not yet justified the necessary development costs.

The results of an interesting power study between "old" and "new" drives are shown in Table I.

Variations in readings for a given speed in Table I were caused by slight differences in wall thickness as this was the first pass of pierced billets.

A power analysis revealed that running-light losses on bench No. 5-6 was 6.03 kilowatts at 32 feet per minute and on bench No. 7-8 was 5.35 kilowatts at 24.53 feet per minute. Now assuming constant torque load requirements, as essentially substantiated by a study of the Table I for No. 7-8, on the effect

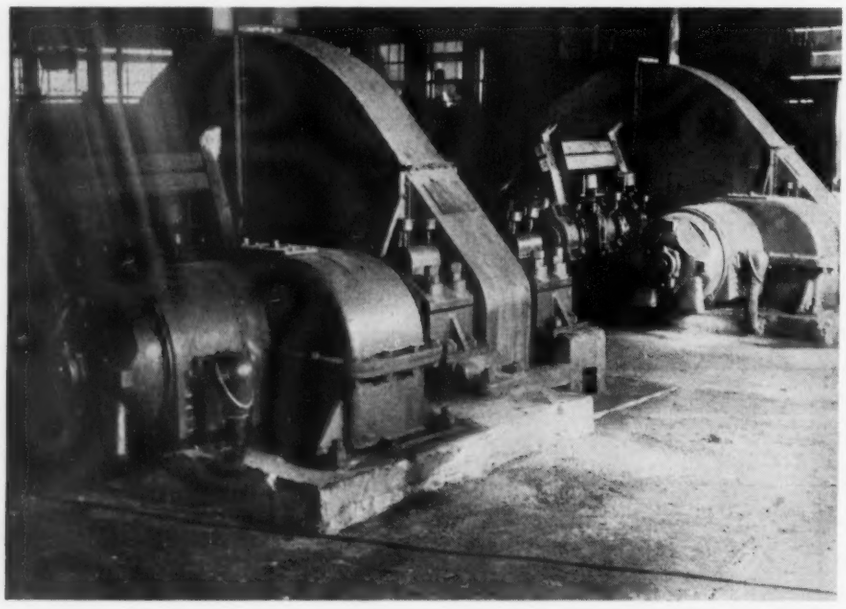


Fig. 1—Drawbenches No. 5-6 modernized with installation of gearmotor drives

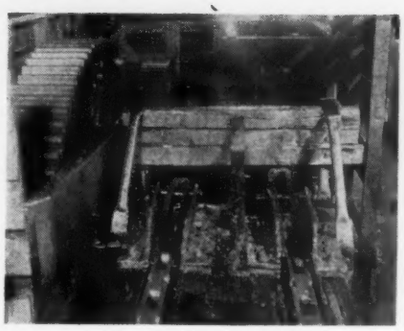


Fig. 2—Old type drive as used in bench No. 7-8 with three open gear reductions and one idling reduction for second speed

of speed on power requirements we have:

$32-24.53=7.47$ feet per minute

$7.47/24.53=30.45$ per cent

$5.35\times130.45=7$ kilowatts, the running-light losses on bench No. 7-8 at 32 feet per minute.

Average kilowatt input of bench No. 5-6 when drawing one tube is 28 kilowatts or 37½ horsepower. Average kilowatt input of bench No. 7-8 when drawing one tube is 23 kilowatts or 30.8 horsepower at 24.53 feet per minute and 15.2 kilowatts or 20.3 horsepower at 15.45 feet per minute. For the purpose of comparing the two drives: The work input on No. 7-8 at 24.53 ft. per min.$=23-5.35=17.65$ kilowatts. The work input on No. 7-8 at 15.45 ft. per min.$=15.2-5.15=10.05$ kilowatts. The increase in work input from 15.45 to 24.53 feet per minute is 7.60 kilowatts. Therefore the increase in work up to 32 feet per minute from 24.53 feet per minute is $7.6\times7.47/9.08$ or 6.28 kilowatts.

Now the work input at 32 feet per minute is 17.65 plus 6.28 or 23.93 kilowatts. The loss input at 32 feet per minute is 7.00 kilowatts. Total input at 32 feet per minute on No. 7-8 then is 30.93 kilowatts or 41.4 horsepower.

The power saving in modernized drive No. 5-6 over old drive No. 7-8 is $30.93-28$ which is 2.93 kilowatts or 3.9 horsepower, a difference of 10½ per cent.

Space required by drive on bench No. 7-8 is 115.4 square feet and space required by modernized drive No. 5-6 is 62.6 square feet, a saving of 52.8 square feet in floor area.

There are periods during the day's operation when only one tube is being drawn while at times two tubes are being drawn simultaneously. Also time must be allowed for the long return, change of dies, etc. Assuming the average for the day's operation is the equivalent of drawing one tube, then for 22½ hours per day operation and 26 days per month, the saving is $22\frac{1}{2}\times26\times2.93$ kilowatts or 1714 kilowatt hours per month. At $0.0168 per kilowatt hour this amounts to $28.77 savings per month. This is sufficient to amortize total cost of new drive No. 5-6 (not including installation costs) in less than four years.

Improves Working Conditions

In addition, savings in floor space total 45.7 per cent.

Although power and space savings are the only tangible considerations, too much emphasis cannot be given to the favorable effect of such a decided improvement in working conditions. Quiet, enclosed, dependable drives entirely free from the hazards of slippery floors, etc.

Table I

Bench	Operation	Speed Ft. per Minute	Volts	Amps.	Input KW	Power Factor	KVA	Calculated K. W.
7–8	Running Light..	24.53	235	43	4	30	17.8	5.35
7–8	Drawing 1 Tube	24.53	235	73	23	74	30.1	22.2
7–8	Drawing 1 Tube	24.53	235	70	22	73	28.4	20.7
7–8	Drawing 1 Tube	24.53	235	70	22	73	28.4	20.7
7–8	Drawing 1 Tube	24.53	235	78	25	78	31.7	24.7
7–8	Drawing 1 Tube	24.53	235	72	23	74	29.2	21.6
7–8	Drawing 1 Tube	24.53	235	72	23	74	29.2	21.6
7–8	Running Light..	15.45	235	43	3	29	17.8	5.15
7–8	Drawing 1 Tube	15.45	235	55	15	63	22.3	14.0
7–8	Drawing 1 Tube	15.45	235	57	16	64	23.1	14.8
7–8	Drawing 1 Tube	15.45	235	55	15	63	22.3	14.0
7–8	Drawing 1 Tube	15.45	235	55	15	63	22.3	14.0
7–8	Drawing 1 Tube	15.45	235	53	15	63	21.5	13.5
5–6	Running Light..	32.0	235	53	4	28	21.6	6.03
5–6	Drawing 1 Tube	32.0	235	95	30	..	....	....
5–6	Drawing 1 Tube	32.0	235	80	26	..	....	....
5–6	Drawing 1 Tube	32.0	235	90	28	75	36.5	27.4
5–6	Drawing 1 Tube	32.0	235	85	28	74	34.6	25.6

Notes: All above tubes are SAE 1015 steel reduced from 2-inch outside diameter with 0.165-inch wall thickness to 1¾-inch outside diameter tubes with 0.134-inch wall thickness.

Bench No. 7-8 driven by 50-horsepower motor at 870 revolutions per minute with three open gear reductions and one idling reduction for second speed.

Bench No. 5-6 identical to No. 7-8 except driven by 50-horsepower, type FD-504 gear motor eliminating all open gearing except bull gear and pinion.

Calculated kilowatt figures were obtained from readings of volts, amperes and power factor. These figures are considered preferable in calculating the "running light losses" as direct readings of the K. W. meter were quite low on the scale. In this range the instrument is inherently less accurate.

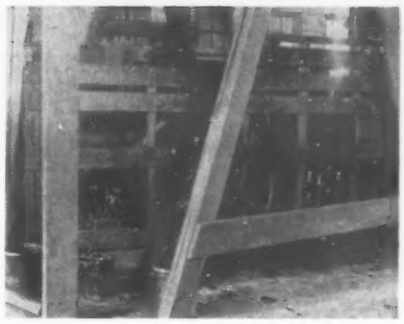


Fig. 3—This shows barrier and A-frames used with old type open gearing

definitely do encourage the operators to take more pride in their surroundings and to do better work.

Offers New Nickel Alloy In Fabricated Forms

■ Driver-Harris Co., Harrison, N. J., is now offering "Z" Nickel in various fabricated forms and different degrees of temper. This new alloy, recently introduced by International Nickel Co. Inc., New York, (STEEL, Sept. 12, page 70), contains a minimum of 98 per cent nickel, is easily fabricated in its soft state, takes on a high degree of strength and hardness following a simple hardening treatment, and possesses a high corrosion resistance.

In the unhardened or quench-annealed state, "Z" Nickel is as readily worked as nickel, including bending, drawing, machining and hot forging. When heat treated, however, at low temperatures of 890 to 930 degrees Fahr., it attains a hardness of Rockwell C 35-45, at which levels it is said to be two and one-half to four times as strong as structural carbon steel and possesses good toughness.

The alloy is being fabricated by Driver-Harris Co. in cold-drawn rods, wire, and cold-rolled strip, in a wide range of sizes. Such forms are available in soft, half-hard and full-hard tempers to meet intended fabrication and application requirements. Since the extremes of initial softness and ultimate hardness determine the full value of this alloy to users, exceptional care is taken by fabricators in rolling and drawing operations.

Many applications are being found for the new alloy, these already including coil springs, spring clips, wire brushes, hand tools and other items. The material is claimed to be particularly suitable for deep drawing of parts that must withstand exceptionally rough treatment.

Ferrous Foundry Practice Studied At Second Cornell Conference

■ FOUNDRY practice in connection with the production of gray iron, malleable iron and steel castings occupied the attention of 200 foundrymen attending the second regional foundry conference at Cornell university, Ithaca, N. Y., Nov. 25-26. The meeting was conducted under joint sponsorship of the Buffalo chapter of the American Foundrymen's association, Syracuse Foundrymen's association and the university's college of engineering. Although designed primarily to serve interests of northwestern New York foundrymen, the conference attracted visitors from Illinois, Ohio, Pennsylvania and New Jersey.

Specific subjects discussed at several technical sessions were malleable short cycle anneal, gates and risers, cupola practice, manufacture of steel castings, sand control, elementary metallurgy and dust hazards. Speaking at a luncheon, Dexter S. Kimball, dean emeritus, college of engineering, Cornell university, presented an interesting address on ancient bronzes, and at the dinner meeting, J. A. Voss, director of public relations, Republic Steel Corp., Cleveland, spoke on "Some Practical Ideas About Industrial Relations."

Discusses Graphitization

Prefacing a paper on malleable iron, W. J. Diederichs, metallurgist, Autocar Co., Ardmore, Pa., said a brief discussion of graphitization would serve to clarify results obtained in standard practice. The more recent trends have resulted from study of the graphitization process and application to practice of information so developed.

Beginning with steel, he stated that structural makeup and changes occurring during heating and cooling cycles have been the subject of long research and existing knowledge is precise and complete. Metals are crystalline materials and the crystals are arranged in definite geometric patterns. Some metallic elements form into more than one arrangement, depending upon conditions. Different arrangements produce different physical and chemical properties. Up to 1670 degrees Fahr., iron has one arrangement; above that temperature the atomic arrangement changes. Up to 1670 degrees, iron will not take carbon into solution; above that point, it absorbs various amounts depending upon time and other factors.

The malleable iron industry, as well as gray iron, Mr. Diederichs claimed, is based on the fact that iron carbide is not stable. In cast irons, this material breaks down into its constituents, iron and carbon, or graphite. Silicon seems to make carbon more unstable; it also raises the temperature and speeds chemical action at higher temperatures. The speaker described the structure of white iron and what happens when it is heated to between 1600 and 1700 degrees Fahr.—first stage anneal to equilibrium.

The speaker followed with a description of the second stage and an outline of the standard 7 to 9-day anneal. Further description covered several features including too short a period in the first stage, cooling too quickly, proper time at all stages, formation of bullseyes and pearlite, and effect of holding below critical range as a corrective.

In the latest trend toward short cycle annealing time, certain foundries are leaving former standard analyses and are raising the carbon and silicon contents. Instead of the usual combined content of 3.20 to 3.40 per cent, one is running as high as 3.90 per cent (2.70 carbon and 1.20 silicon). Another making light castings is reported going to silicon 1.60 to 1.90 per cent and carbon 2.00 to 2.40 per cent. Complete graphitization in about 15 hours is reported.

Pat Dwyer, engineering editor, *The Foundry*, Cleveland, discussed gates and risers principally from the viewpoint of the part they play in production of defective castings. He claimed that fundamentally production of castings is a simple process. A pattern is placed in a simple container of wood or metal, or a hole in the floor. It is surrounded with packed sand, then withdrawn and the resulting cavity is filled with molten metal which upon solidification assumes the shape of the pattern.

Casting Not So Simple

Apparently, said Mr. Dwyer, nothing could be more simple; yet successful production of castings represents highly specialized effort. A multiplicity of detail is involved. Unless every detail is carried out faithfully and unless every factor synchronizes and co-ordinates with the others in orderly sequence, the casting will not serve the purpose for which it is intended.

Dust hazards in foundries were discussed by Dr. Leonard Greenburg, executive director, division of industrial hygiene, state department of labor, New York, and E. O. Jones, director of safety and hygiene, American Foundrymen's association, Chicago. The former based his address on a statistical survey of 80 foundries in New York and the conclusions drawn from an analytical study of these figures. Final results will be published when the study is completed.

Mr. Jones told of practice in several plants where intelligent cognizance is taken of inherent dust hazards, and the means adopted to reduce these hazards. In one plant, a man walks through every day armed with a large salt shaker filled with a particularly offensive smelling powder. He sprinkles a little of this material at any point that does not conform to the general good housekeeping policy.

Reward Cleanliness

In another plant, a contest is held each month. The foreman with the highest rating on the good housekeeping program receives a box of cigars, and, perhaps more important as a measure of keeping him up on his toes, his wife receives a 5-pound box of candy. The open house program staged once a year by several progressive companies have proved a powerful incentive in keeping plants spick and span. In several instances, a series of candid camera studies of areas before and after a general cleaning has proved effective.

Contributing a paper on cupola practice, Donald J. Reese, International Nickel Co. Inc., New York, considered the cupola as a long-time investment. He asserted that a unit operating under ordinary conditions and with the initial expense amortized over a period of 20 years represents an extremely small outlay. On the subject of cupola operation, the speaker said that one of the most important factors is the amount of the bed charge of coke. He stressed the advisability of using the smallest size cupola consistent with production demands.

Dealing with progress made in steel castings, K. V. Wheeler, Lebanon Steel Foundry, Lebanon, Pa., pointed out that today we are making castings which 25 or 30 years ago were outside the scope of practical accomplishment. Alloying, melting, molding, coremaking, and heat treating technique have advanced to meet the most severe specifications. Designing engineers work in harmony with foundrymen and are willing to modify design if necessary to meet foundry require-

(*Please turn to Page* 75)

Advertisement

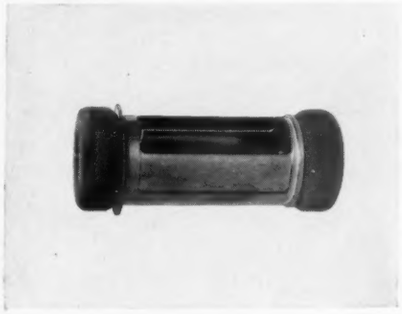
COPPER ALLOY BULLETIN

Reporting News and Technical Developments of Copper and Copper-Base Alloys

DECEMBER — "Bridgeport" BRASS CO. — 1938

DURONZE SELECTED FOR USE IN GROVER CASH CARRIERS

The Grover Company, makers of cash carriers, found in the high strength of Duronze* II the solution for an unusual manufacturing problem. A longer opening was needed in the shell to accommodate sales checks and alteration tags, but the overall length of the carrier could not be increased because of operating requirements of carrier systems which involve short turning radii and right-angle bends at many points along the conveyors.



When the longer opening was cut in the standard brass shell, it was weakened so much that it easily became distorted. By substituting Duronze II for brass, it was possible to increase the length of the opening and retain ample strength, for Duronze II, in addition to the ductility of copper and the endurance of fine bronze, possesses the strength of steel. Duronze II does not become brittle when hard worked, and is resistant to season cracking. By making the shells a trifle longer than standard and folding back the extra length, The Grover Company produced shells of much greater strength than previous designs, while the carriers remained fully interchangeable with other types.

Properties of Deoxidized Copper

Recent investigations indicate that deoxidized copper may have definite advantages over tough-pitch copper when cast in shapes intended for the rolling mill. According to reports of the American Institute of Mining and Metallurgical Engineers, comparisons were made between a sample of the ordinary type of wire bar cast horizontally in an open mold and a sample of deoxidized copper cast in a vertical mold. Plastic characteristics of the deoxidized copper were apparently superior.

PERIODIC CHECK OF METAL SPECIFICATIONS PREVENTS PURCHASING OBSOLESCENCE

In an era in which the problem of obsolescence is receiving increased attention, far-sighted manufacturers are aware that obsolescence may enter into the purchase of raw materials under outmoded specifications as well as into the production process. For this reason many fabricators have recognized the advisability of instituting a periodic check of these specifications.

Two chief factors contribute to the possibility of obsolescence in metal purchases —changes in production methods, and the introduction of new alloys. In the production process, rapid improvements in equipment and methods of fabrication may radically change the requirements for the metal used, even though the finished product remains superficially the same. Moreover, even though no major changes take place in production, the steady development of new alloys has resulted in a considerable expansion of the metals available.

Knowledge of Metals Involved

A check-up of metal purchasing specifications, in order to insure both maximum quality and economy, should therefore be made with a full consideration of all the factors involved. Most important among these factors are the types of fabricating process used and the type of service to which the product will be subjected. The successful execution of such a survey requires not only a knowledge of the demands made upon metals by fabricating and service requirements, but also a comprehensive understanding of the characteristics of the metals themselves.

Many manufacturers find it advisable to supplement their own intimate knowledge

(Continued on Following Page)

Non-Fuming Welding Rod Produces Strong Welds†

Bridgeport's Welding Rod No. 192 has special advantages in the welding process because of its non-fuming properties. The rod is manufactured of manganese bronze to which a small amount of silicon has been added. The silicon content produces the non-fuming quality. In addition, it has a fluxing action which results in the formation of sounder metal and hence of stronger welds than can be obtained with ordinary types of welding rods.

The rod flows smoothly during the welding process, and produces a clean, bright weld, free from the black manganese dioxide film that is sometimes formed by rods high in manganese content.

†*Mfd. under U. S. Pats. Nos. 17,631 and 1,525,058.*

The extensive testing facilities of the Bridgeport laboratories are available to assist manufacturers in modernizing their metal specifications.

PREPARED EACH MONTH BY THE BRIDGEPORT BRASS COMPANY

Headquarters for Brass, Bronze and Copper

COPPER ALLOY BULLETIN

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. Further information on any of these items may be obtained by writing the Bridgeport Brass Company, who will gladly refer readers to the manufacturer or other source.

A new welding cable provides a water-cooled connection between secondary taps of transformer and portable welding gun. It consists of a central rubber core around which are helically wound flexible, tinned copper cables. Leads of opposite polarity are separated by a corrugated live rubber spacer. The construction permits circulation of the cooling water through the core. Outer cover is a flexible rubber tube, reinforced with wire and woven fabric.

Exhaust equipment for grinding and polishing machines consists of a pair of hoods, pipe connections, and motor-driven blower. A filter can be connected to the delivery side of the blower to collect the dust, permitting only clean air to escape.

A metal-working lathe provides spindle speeds ranging from 40 to 1,200 RPM.. cuts screw threads from 4 to 112 per inch, and has power longitudinal turning feeds of 0.002 to 0.015 inch. It is said to be especially suitable for machining very small diameter parts of brass and other metals.

A brazing torch is suitable for light brazing, soldering, and for heating copper pipe fittings in sizes to ¾ inch. It produces a brush-type blast flame ranging from 3 inches in length and ⅜-inch diameter to 8 inches by ⅝-inch. Temperatures up to 2,500 degrees F. can be obtained. The torch operates on compressed gas supplied in small cylinders by the manufacturer of the torch.

A sanding machine is said to impart a gyratory motion which approximates hand sanding, and is suitable for finishing lacquer or other coats on metal surfaces. Unit consists of a ¾-horsepower motor mounted on caster-equipped stand, with a flexible shaft for transmitting power to the tool head.

A new scleroscope is pocket-size and weighs only one pound. Hardness is measured by a diamond-pointed hammer which rebounds after striking the work; height of the rebound is indicated by a dial which records the hardness of the metal.

A combination instrument includes a metallurgical microscope and camera assembled into one permanently aligned unit. The camera is equipped with a device that changes the magnification of eye-piece by turning a dial. Stage of the microscope is of the inverted type and accommodates polished or fractured specimens of apt shape. Exact standard magnifications for grain size estimations are readily obtained.

A spot welder is designed to handle medium-duty welding of sheet metal. Pressure and current are applied by a foot-treadle. Welding current is controlled by means of a heavy-duty switch.

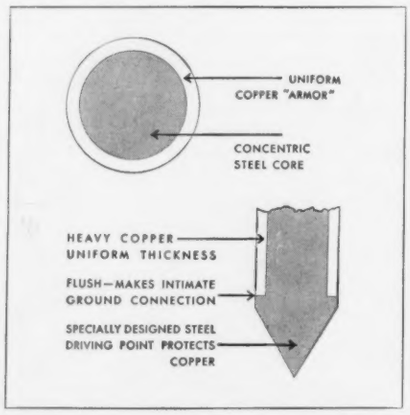
METAL SPECIFICATIONS

(Continued from Preceding Page)

of their production processes and service requirements by the knowledge of metals possessed by a skilled metallurgist. Metallurgical assistance in the making of surveys of metal specifications is an important part of the service to customers which is made available by Bridgeport's extensive laboratory facilities and skilled engineering staff. In addition to original research work in the properties of existing metals and the development of new alloys, the laboratories at Bridgeport are equipped to serve as an important adjunct to the fabricator's own facilities, by studying the suitability of metals of various compositions and tempers to specific requirements.

Copper Ground Rods Resist Rust

Bridgeport Copper Ground Rods, made with a thick, uniform "armor", of copper around a strong steel core, are extensively used in applications requiring grounding for protection, particularly in soil that is moist or has been treated to reduce ground resistance. The copper "armor" gives long life in places in which unprotected rods rust quickly.


UNIFORM COPPER "ARMOR"
CONCENTRIC STEEL CORE
HEAVY COPPER UNIFORM THICKNESS
FLUSH—MAKES INTIMATE GROUND CONNECTION
SPECIALLY DESIGNED STEEL DRIVING POINT PROTECTS COPPER

Bridgeport Copper Ground Rods have a point specially designed for easy driving. The construction of the point protects the copper against damage when the rod is driven into the ground, and gives highly efficient electrical contact.

Line Material Co. is national distributor for Bridgeport Copper Ground Rod.

ALLOYS OF COPPER

Many readers of the COPPER ALLOY BULLETIN have requested the publication of detailed technical information on the various copper alloys. In response to these requests, we are initiating with this issue a series of articles on the composition, physical properties, fabricating processes, and product applications of the more important copper alloys. Each of the alloys will be treated in one or more articles.

COMMERCIAL BRONZE

Commercial Bronze is an alloy consisting of 90% copper and 10% zinc. From the metallurgical standpoint, the use of the term "Bronze" is questionable, because this term properly applies to an alloy containing tin, but the industry has used the name "Commercial Bronze" for so long a time that it has become well established. There are numerous modifications of this alloy, which, while they are not truly Commercial Bronzes, are so similar that they are included in the same class.

The following physical characteristics apply only to the 90-10 alloy. Any modification in the composition will of course produce changes in the physical properties also:

Analysis . . . . . 90% copper, 10% zinc
A.S.T.M. Specifications . B36-38T, Sheet
Modulus of Elasticity,
15,000,000 lbs. per sq. in.
Density . . . . . .318 lb. per cu. in.
Coefficient of Linear Expansion,
0.0000175 per deg. C. (25-100 C.)
Electrical Conductivity,
43% (Copper 100%)
Thermal Conductivity,
47% (Copper 100%)

General Characteristics

Commercial Bronze is somewhat stronger than copper and has equal or better ductility. The structure of the alloy consists of uniform copper and zinc atoms in solid solution. This type of structure produces a ductile metal that is suitable for cold working and forming operations, but not for machining.

The subject of Commercial Bronze and its modifications will be concluded in next month's issue.

The services of the Chemical and Metallurgical staff of the Bridgeport Brass Company are available to customers for the solution of problems pertaining to their metal requirements.

PRODUCTS OF THE BRIDGEPORT BRASS COMPANY

Executive Offices: BRIDGEPORT, CONN.— Branch Offices and Warehouses in Principal Cities

SHEETS, ROLLS, STRIPS—*Brass, bronze, copper, Duronze,** for stamping, deep drawing, forming and spinning.

CONDENSER, HEAT EXCHANGER, SUGAR TUBES—For steam surface condensers, heat exchangers; oil refineries, and process industries.

PHONO-ELECTRIC* ALLOYS—High-strength bronze trolley, messenger wire and cable.

WELDING ROD—For repairing cast iron and steel, fabricating silicon bronze tanks.

LEDRITE* ROD—For making automatic screw machine products.

BRASS "Bridgeport" CO.

Established 1865

COPPER WATER TUBE AND FITTINGS—For plumbing, heating, underground piping.

DURONZE ALLOYS—High-strength silicon bronzes for corrosion-resistant connectors, marine hardware; *hot rolled sheets* for tanks, boilers, heaters, flues, ducts, flashings.

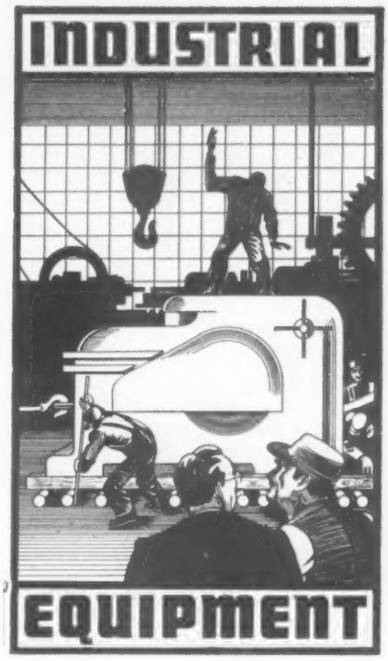
BRASS, BRONZE, DURONZE WIRE—For cap and machine screws, wood screws, rivets, bolts, nuts.

FABRICATING SERVICE DEPT.—Engineering staff, special equipment for making parts or complete items.

BRASS AND COPPER PIPE—"Plumrite"* for plumbing, underground and industrial services.

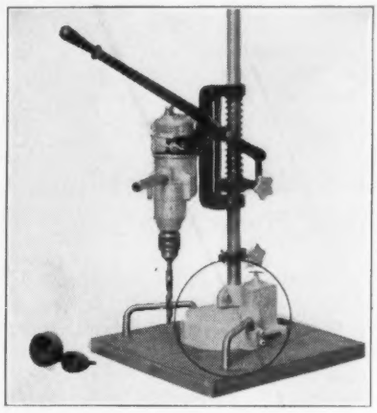
*Trade-name.

BRIDGEPORT BRASS



Portable Drill Stand Magnet Adds Flexibility

■ Stearns Magnetic Mfg. Co., Milwaukee, has introduced a powerful, yet small and light drill stand magnet, designed to increase usefulness



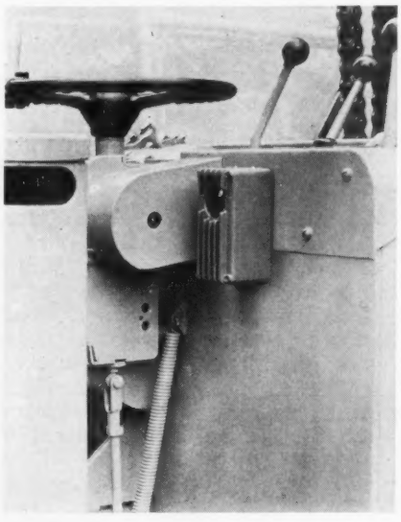
of a drill stand by permitting unit to be readily conveyed and spotted in almost any position where drilling, tapping, reaming, hole sawing or nut running are required.

Use of magnet is said to enable operator to increase his capacity with reduced fatigue strain. Drill can be operated horizontally, vertically, upside down or at almost any angle. Magnet allows full visibility and can be used on all parts, center or edges, of the material.

Portable drill stand magnet weights 40 pounds and has a pull of 900 pounds. It is 8½ inches in diameter and consumes 80 watts, either alternating current or direct current.

Battery Discharge Is Indicated by New Device

■ Electric Storage Battery Co., Allegheny avenue and Nineteenth street, Philadelphia, has announced a new discharge indicator for use



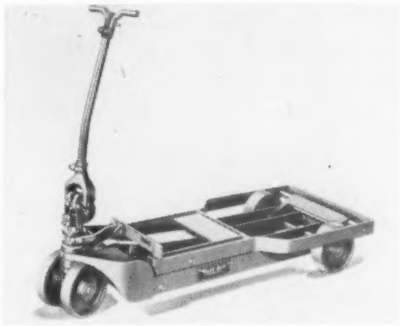
on electric industrial trucks and tractors.

Device is assembled in a sturdy case, and mechanism is protected further by spring suspension which enables it to absorb shock without damage. Function of indicator is to enable a truck operator to see when his battery is approaching a discharged condition, thus eliminating time-consuming "tow-ins".

Warning is made by a red light. At first there are momentary flashes as time for recharging approaches; then, as battery discharges further, light remains on for a longer time. Finally, when light remains on all the time, operator knows his truck should go in for a battery change.

Hydraulic Lift Truck Built to Resist Shock

■ West Bend Equipment Corp., West Bend, Wis., has announced an unusual lift truck, outstanding feature of which is its self-contained



hydraulic unit, placed in a horizontal position in the truck's frame. Unit is entirely insulated from head of the truck, only connections being the connecting rods from pump lever to pump rod. It is thus protected from lateral and vertical shocks.

Truck has an all-welded steel head and frame. Standard lift is 3 inches with higher lifts available, and truck can be elevated to maximum height with handle in any position 360 degrees in a complete circle. Handle release is directly beneath handle grip, and lowering pedal is on head of the truck, with lowering speed controlled by foot pressure.

Standard capacities of 2500, 3500, 5000 and 6000 pounds are available, and trucks of greater capacity may be had on special order.

Combines Microscope and Camera in Aligned Unit

■ George Scherr Co., 128 Lafayette street, New York, recently announced the Busch Metaphot, a metallurgical microscope that is actually a combination of microscope and photographic camera assembled into one permanently aligned unit.

Instead of bellows the camera is equipped with the Vario-Ocular, a device which changes magnification of any eyepiece optically at the turn of a dial. Standard magnifications of 100, 200, 500, 1000 and 2000 diameters are obtainable.

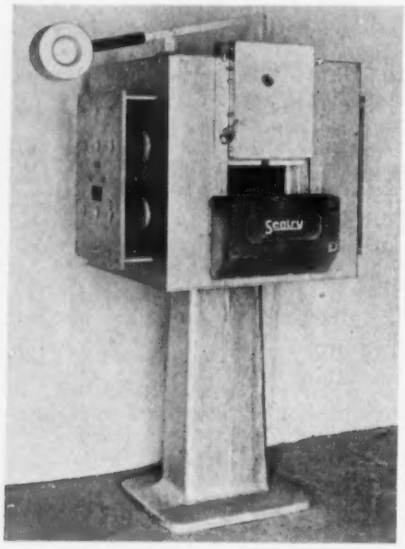
This instrument is designed to meet requirements of shop and testing room. It takes less space than a typewriter and is shock and dust proof. Lamp house can be tilted for inspection of machined or finished surfaces. Stage of microscope is inverted type; it accommodates pol-

ished or fractured specimens of any size or shape. Type of illumination may be changed instantly from bright field to dark field, vertical or oblique illumination.

Introduces Furnace for Hardening Larger Tools

■ Sentry Co., Foxboro, Mass., has added to its line another full muffle furnace for hardening high speed steel. Known as No. 3 Model Y, this furnace is larger than the two models which preceded it, Nos. 1 and 2, but it has essentially the same design.

The new furnace has six heating elements, three above and three below the muffle. It employs air-cooled terminals. A heat of 2350 degrees Fahr. may be obtained in 75 minutes, current consumption at



this temperature being between 5½ to 15 kilowatts, depending on amount of work hardened.

Furnace can be supplied with any standard make of temperature control. It is designed especially to secure advantages of atmospheric control.

Price of furnace complete with asbestos front shelf and muffle is $598.

Ratio Meter Shows Fuel And Air Relationship

■ Askania Regulator Co., 1603 South Michigan avenue, Chicago, has devised a direct reading ratio meter for use on all types of heating equipment, whether fitted with automatic fuel-air ratio control or manually operated.

Ratio meter consists of two flow metering elements, one for air and one for gas. Pointers shown are arranged to cross in the chart area so that intersection of pointers indicates relation between the two

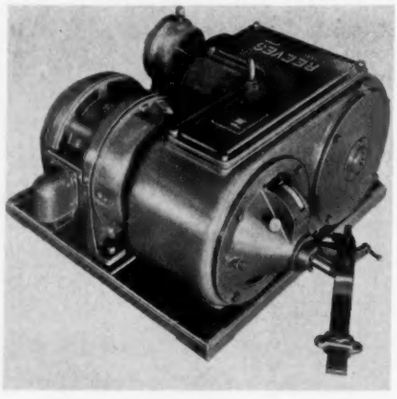
flows. When pointers cross on the vertical or zero line, indication is that a neutral flame is being maintained. If they cross in area to the right, it shows percentage of excess air. Conversely, if pointers cross in the deficiency area, meter will show air deficiency.

This type of instrument may be adapted to other conditions to show relationship between two variables.

Adds Automatic Control To Variable Speed Unit

■ Reeves Pulley Co., Columbus, Ind., has developed mechanical automatic control for its Motodrive, making possible synchronization of different machines and separate sections of a single machine; maintenance of constant tension and uniform peripheral winding speeds; and maintenance of uniform pressure, weight, liquid level, temperature and other variable elements.

Control is distinguished by ruggedness and simplicity of design. On the motor shaft is a cover plate including a lever bracket and extended lever which may be attached by cable or chain or direct to a com-

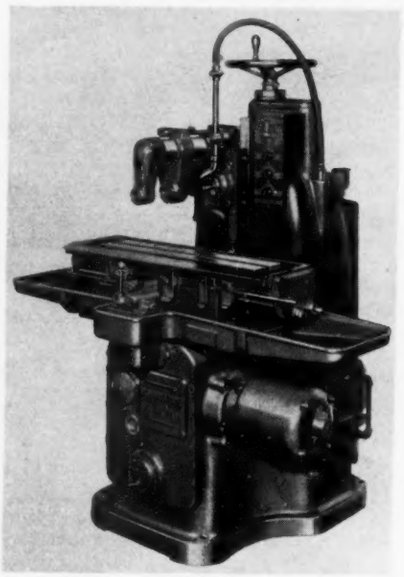


pensating or floating roll, pressure regulator, moving carriage or part of machine, from which indication of required speeds can be taken. Movement of lever is transmitted to speed changing mechanism of Motodrive to change its speed in accordance with indicating movement.

Travel of lever in either direction is limited by stop screws. Lever may be any length and may be assembled in any of four positions. Control is available for all five sizes of variable speed control units, both horizontal and vertical designs. Illustration shows horizontal unit with control.

New Milling Machines Have Hydraulic Feed

■ Sundstrand Machine Tool Co., Rockford, Ill., recently introduced its Number 0 Rigidmil, with either hydraulic or hand feed, a versatile machine for production milling of small parts for business machines,



automotive equipment, electrical appliances, etc.

Hydraulic equipment enables this machine to do climb cutting and conventional milling separately or in combination in a wide variety of cycles controlled by easily adjusted dogs.

Compact, rigid base with integral column provides ample support for saddle, spindle head and pumping unit. Any rate of hydraulic feed between minimum and maximum can be obtained by simple adjustment. Control unit provides manual regulation of table movement in addition to automatic cycles governed by adjustable dogs. Switches controlling all electric motors, spindle direction and safety stop are mounted in a clearly marked panel on front of column.

Self-contained spindle head, with its own motor drive, is easily and

accurately locked at any adjusted height on the column. It is available in two speed ranges of 25 to 1200 revolutions per minute and 50 to 2400 revolutions per minute respectively.

Built on the same integral base column casting having a table 8 inches by 30 inches with maximum travel of 14 inches, this milling unit is also available for milling operations on which hand feed is preferred.

For somewhat larger and heavier work than the Number 0, the Number 1 Rigidmil, with Sundstrand hydraulic feed, has characteristic rectangular overarm and removable outboard braces, is not made in hand feed type. In all other respects the Number 1 Rigidmil is similar to the Number 0 machine.

Hoist Cooling System Minimizes Brake Heat

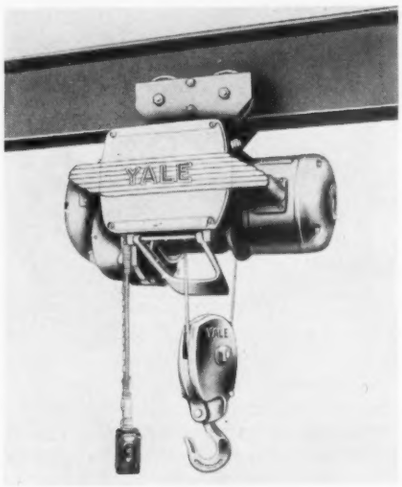
■ Yale & Towne Mfg. Co., Philadelphia, has added to its line of electric hoists the Cable King, an air-cooled unit ranging in capacity from ¼-ton to 6 tons.

Air-cooling is accomplished by a Sirocco blower action which produces an effective degree of low pressure air circulation and cooling on the brake frictional parts of the hoist, eliminating excess brake heat. Fins are cast in the brake drum in the line of the air stream. As load is lowered, fins revolve producing a constant flow of air around brake and gear housing. Vents are provided in bottom of housing.

Main hoist frame is a heavy one-piece ribbed steel casting, providing a rugged support for the drive mechanism. Gears and pinions are straight spur geared type, integral drop forgings of chromium nickel steel, heat-treated for wear resistance. One point oiling, through a filling plug on head of the gear housing, provides an oil reservoir for entire internal hoist mechanism and load brake of sufficient capacity for six months' operation.

Upper limit stop prevents overtravel of hoist cable. Motor brake is self-actuating through interlock with the controller. It is actuated by a large plunger type solenoid. Brake has sufficient capacity to hold a full rated load. All controllers are contactor type with automatic return-to-neutral, mounted in a weatherproof box. Hoist wiring is enclosed in permanent metal conduits.

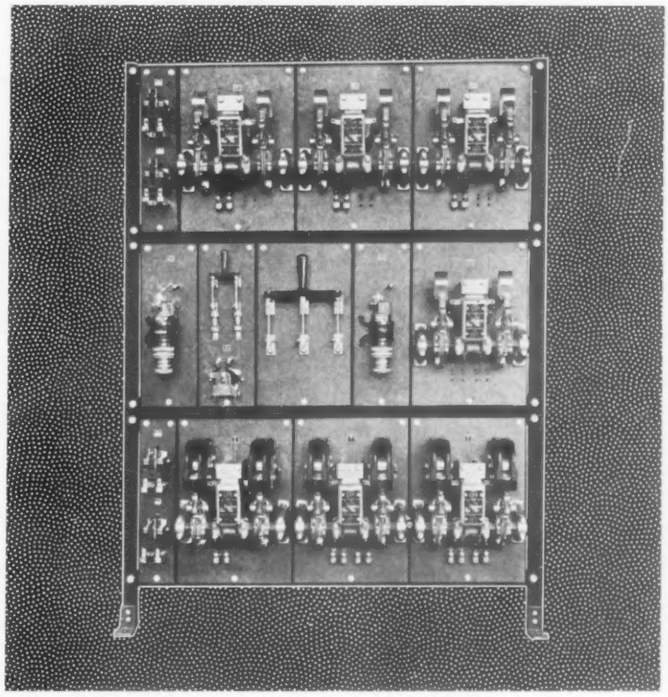
Reversing type motor has enclosed ball bearings, is weatherproof and dust-tight, and is designed to operate under constant service with full load without destructive overheating.



Cuts Cable Temperature

■ Delta-Star Electric Co., 2400 block, Fulton street, Chicago, has announced a type SAO 2500-ampere, 7.5-kilovolt terminator or cable end seal for 2.74-inch outside diameter cable. Terminator has a ventilated stuffing box entrance for 4½-inch conduit. Ventilation gives lower

Quick-Stop-by-Plugging
for A. C. Wound Rotor Motors



EC&M Frequency Relay Magnetic Control provides a new, highly efficient method of operation for this type of drive. Frequency relays regulate acceleration automatically, cutting out rotor resistance only when it is necessary to maintain motor torque at its pre-determined value. And a frequency relay of the same type as used for acceleration but designed to operate exactly at the zero-speed frequency is used to open the reverse torque contactor at the instant the motor comes to rest. This is a distinct forward step in quick-stop-by-plugging control.

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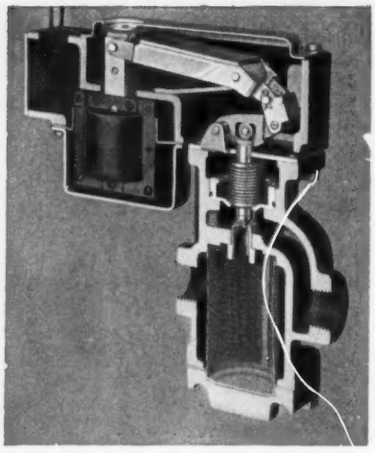
cable temperature and minimizes corrosion of sheaths and conduits arising from moisture condensation within the conduit.

Leverage System Seats Improved Solenoid Valve

■ McDonnell & Miller Inc., Wrigley building, Chicago, has departed from conventional solenoid valve design in the development of its electrically operated valve, made to insure tight closure against water or fluid pressure up to 150 pounds.

Weight of solenoid armature is not depended upon to hold valve closed. Instead it is tightly seated by a spring-loaded leverage system, as shown in illustration. A long lever connected to armature gives solenoid sufficient mechanical advantage for positive opening of the valve.

Valve and seat are stainless steel of file hardness. An unusual feature of the valve is slot-and-roller construction which removes all angular stress from valve stem and assures straight thrust of the cone when seating. Valve is protected by a large built-in strainer. It will handle any fluid not corrosive to its working parts, according to manufacturer.



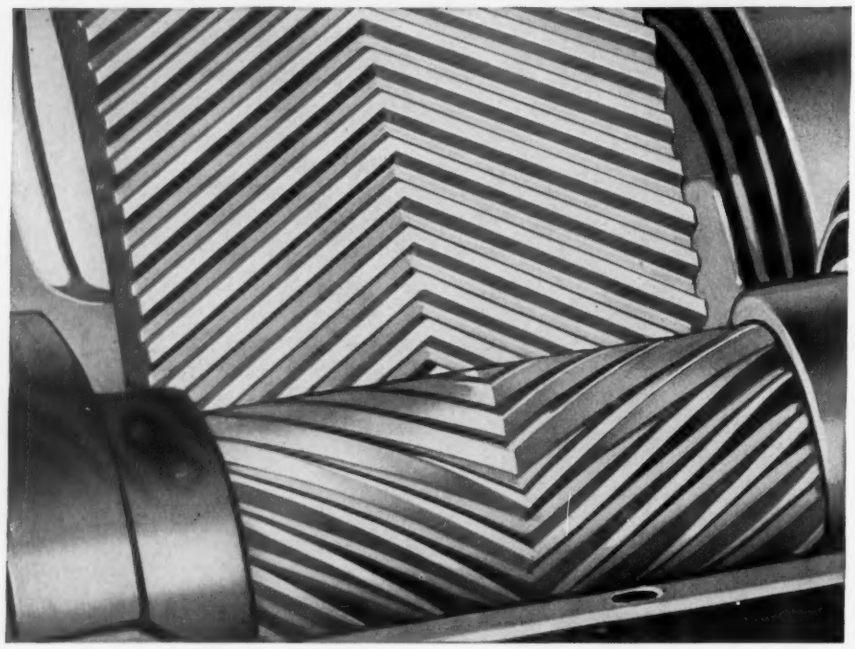
Discharge capacity of valve ranges from 1100 to 3200 pounds per hour. Standard rating is 115 volts 60 cycles, but coils for other voltages and frequencies are available.

Introduces Heaters for Industrial Applications

■ Fedders Mfg. Co., Buffalo, has announced a complete line of series 4 unit heaters, available in 25 models ranging in capacity from 75 to 1200 square feet E. D. R. Improvements include cabinets with integral beading, heating elements with double headers, improved manifolds and full floating mountings, streamline tubes and individual convoluted fins.

Fin surface is designed to reduce dirt and lint accumulation. Monopiece cabinet rigidity combined with sound deadening fabric between casing and fan contribute to quiet operation. Motors are mounted in rubber to isolate vibration, and every motor is tested for absence of hum. Motors for all current characteristics are available, including units for use in explosive conditions.

SMOOTH POWER



● Where speeds are high . . . where smooth operation is required . . . where quietness is a factor, Horsburgh & Scott Herringbone Gears and Speed Reducers are ideal. Gears are Sykes type . . . accurate . . . and with a continuous, double helical tooth . . . giving increased bearing surface . . . greater resistance to wear. They provide the most economical . . . the smoothest known means of transmitting power between parallel shafts.

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Instrument Firing

(*Continued from Page* 55)

the air controller which in turn adjusts a butterfly valve in the air line to create a differential pressure across a single orifice of sufficient magnitude to bring the control back to the balance point. During the furnace reversing interval, current is interrupted so no valve movement can take place on any fuel or in the combustion air line.

The combustion control system also is tied in with the roof temperature control as described later.

Furnace pressure control is the second important regulating unit. A slight pressure maintained in the furnace will hold the products of combustion over the hearth just long enough to give off heat to bath and still maintain flow through furnace. Since furnace pressure is constantly changing, due to reactions in the bath, lifting of a door and regulation of fuel, even the most expert furnace man could not keep up with these changes. With an extremely sensitive automatic control, it is handled fast and accurately. Also it allows induced draft fan to hold a draft of only 0.04-inch of water pressure at the furnace roof, thereby minimizing air infiltration from checkers to stack and around waste heat boiler.

Operates from Differential Pressure

Furnace pressure control on this No. 14 furnace operates from a differential pressure between two places; one is inside the furnace through roof at a point on furnace center line and towards the tapping side. Other place is outside furnace immediately over roof and alongside the pipe through the roof. The pipes go to the controller which through a relay drives a motor to adjust louvre dampers at outlet of waste heat boiler.

When the automatic reversing controller is about to operate, the furnace pressure control is given an impulse to open the damper. As this proceeds, the furnace is reversed and a time delay allows the damper to gradually assume the position necessary to maintain desired furnace pressure. Object of this arrangement is to allow gas and air to be returned quickly to the furnace without blowing out of doors due to a slowly opening damper which would normally tend to close during the reversing period. It also is of assistance in quickly purging the checker chambers.

Roof temperature control, the third important controlling device, is a combination indicating and recording instrument which measures the actual temperature of the furnace roof by means of a radiation pyrometer. A 6-inch pipe is set in the wall on the tapping side and below the skewback through which the temperature of the roof is obtained. When temperature reaches the allowable limit, the equipment cuts back on the amount of coke oven gas and increases the amount of blast furnace gas to keep the gas volume entering furnace almost constant. This prevents upsetting the gas velocity through the furnace by intermittent operation of the temperature limit control equipment.

Value of this control is reflected in brick repair costs as well as in production. It allows the furnace to be run at maximum safe limit without fear of excessive damage. Also, some operators claim the temperature recorded by this instrument is of practical value before tapping as there is an apparent relation at this period to the bath temperature.

The fourth or automatic reversing control is so arranged that actual reversing can be done by time or by temperature-difference method. In the latter case, a thermocouple is located in the regenerative system at each end of the furnace. The couples are connected opposed so when they differ in temperature by the amount set on the controller, the control contacts close and furnace is reversed automatically.

This method does not limit the high or low temperature which may

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be reached in the furnace or regenerative system. It does, however, keep the regenerative system balanced and builds up the same temperature cycle of pre-heat on both ends of the furnace. Control of the actual furnace temperature is the responsibility of the first helper and must be regulated according to stage of the heat. A six point pyrometer records temperatures at all four chambers and guides the operator in regulating temperature to bring the heat up to the desired point. Reversals are actually governed by the operation of the furnace and the maximum of preheated air is made available by correct balancing of temperatures.

By centralizing both manual and automatic controls, the work of operating is greatly eased and adjustments made quickly and without effort. So many new controls have come into practical perfection in the last few years that it has only recently been feasible to centralize. The older furnaces have, of necessity, had instruments applied in installments and placed in almost any available location.

Directly behind the main panel, which supports all the instruments and manual control push buttons, is a duplicate panel where all control manometers and relay equipment are mounted. In the past, these have been scattered around the furnace and often in locations that made checking and repairs anything but convenient. This grouping makes it possible for one instrument man to make checks and note the result almost at the same moment, thus making his work more effective.

Requires Careful Installation

Centralization of all controllers and instruments calls for particular care during installation. Piping must be properly sloped where water or dirt in the gas might cause trouble. It must be possible to shut off each instrument without disturbing the others. Many instruments have failed to give expected results due to faulty installation.

Instruments are possibly in the infant stage of development. The future may disclose astonishing methods of measurement and control of which we are now in ignorance.

All new furnaces should be designed in the drafting room with provision for easy application of a full complement of instruments without having to make major alterations to brick or piping. Even if they are never installed, the additional cost entailed in providing for them is often little more than if their possible addition were ignored.

♦

Location of Controls Was Deciding Factor

■ A design feature proved the deciding factor when a large electrical manufacturer recently placed an order for grinding machines. The production engineers in charge saw only one difference between two makes of machines that they regarded as important. That was the location of the controls. They approved purchase of machines with controls so conveniently located, in their opinion, as to assist the operators in getting out maximum production.

Alloy Cuts Bus Weight

■ Recommended especially for use in the manufacture of trucks and busses, because of the reduction in dead weight effected, a new lightweight alloy, known as Magalloy, has been introduced by Bohn Aluminum & Brass Corp., Detroit. This series of alloys employs magnesium as a base. Although lighter than former materials, Magalloy is said to be unusually strong and rigid.

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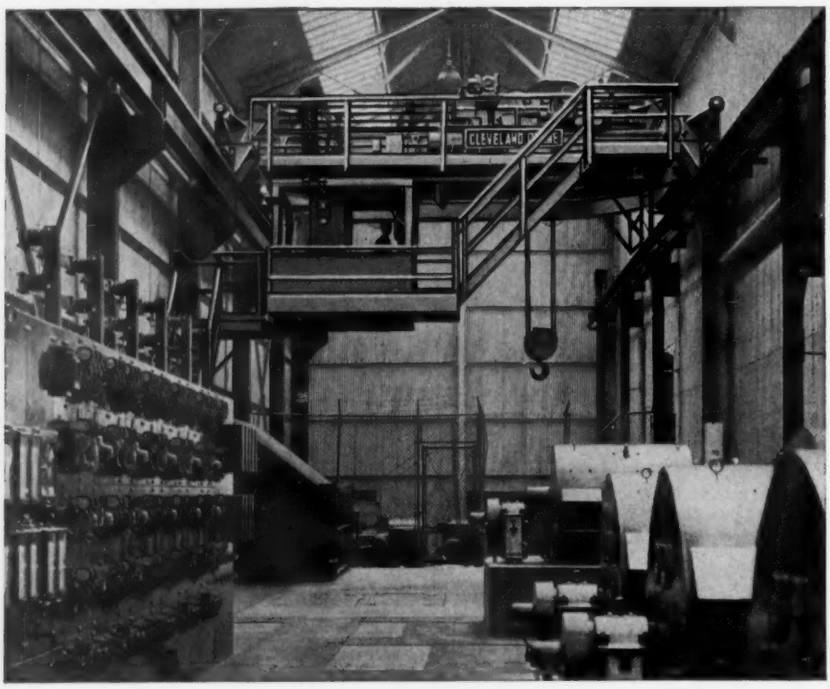

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MATERIALS HANDLING EQUIPMENT

Crane Aids Pickling

(*Concluded from Page* 58)

such section has two pairs of guide wheels mounted on it, these wheels straddling the vertical guide member built integral with crane frame. Racks are lifted by the crane operator lowering the horizontal beam with its hooks and then moving the entire crane sidewise to engage the rack.

Each of the two outside hoists is 4 feet 1 inch from the center hoist. Thus two outside units are on same centers as the tanks, 8 feet 2 inches, so that two loaded racks can be lifted and transferred at one time. This practically cuts the number of lifts in half. The lifting speed of all three hoists is 60 feet per minute.

Handles Empty Racks

The third unit located between the other two is used to handle empty racks. It makes possible a unique system or sequence in handling which eliminates one full travel of the crane for each set of operations. It works like this. When the operator has the crane at the unloading end of the setup, he picks up the empty rack on the center hoist and lifts it above the working height required for the other two racks. He deposits the empty rack at the loading end when he gets the crane back to that position during handling of full racks.

Crane itself is of the underhung type. It is driven by a 3 horsepower, slip ring, gear motor through four air-wheel drives two of which contact each rail. Maximum speed of bridge is 400 feet per minute. This provides rapid travel when moving long distances. Total length of runway is 97 feet and it is supported from box channel girders suspended from the roof trusses and the exhauster platform above. Operator rides with the crane in a cab hung at working level as shown in illustrations.

With the crane operating directly above top of tanks, it was necessary to exhaust all fumes immediately at tank top. This was done successfully by building exhaust ducts completely around the tanks and exhausting from all four sides of each tank. Exhaust opening can be seen around top of tank in immediate foreground of the lower illustration shown on page 58.

Second Cornell Meeting

(*Continued from Page* 66)

ments. The speaker exhibited several examples of welded castings in proof of his contention that welding is a legitimate tool. Properly made welds, he stated, do not detract from the value of a casting.

Two papers dealt with sand control problems. In one, H. W. Dietert, president, H. W. Dietert Co., Detroit, discussed the relation between casting defects and sand properties, and in the other, H. L. York, experimental engineer, Cornell university, reviewed tests of steel sand mixtures at high temperatures.

Mr. Dietert explained that a mold passes through six stages during pouring and setting of the metal and certain sand factors in any of these stages may produce defects. The speaker described various defects and suggested remedies through sand control.

The contribution of Mr. York represented a progress report on research outlined by the A.F.A. subcommittee on steel sands and carried out under the committee's direction at Cornell university. Object of the investigation is to determine how steel sand mixtures behave when heated to different temperatures, principally as to compressive strength, expansion and contraction, and effects of different bonding materials.

Tentative conclusions show that sands crushing under load at temperatures below 2102 degrees Fahr. indicate no sign of fusing. There is no visible difference between a broken sample and the same sample mashed at 10 degrees higher temperature. Bentonite bonded sands disintegrate completely upon cooling from temperatures above 1652 degrees Fahr. provided they are not fused. The bond does not appear to hold them together. Rate of cooling merely affects the time of complete disintegration. Fire clay bonded sands do not crumble upon cooling from any high temperature, except those which might be severely affected in the shock test.

H. C. Waldron, assistant foundry superintendent and metallurgist, Nordberg Mfg. Co., Milwaukee, contributed a paper on elementary metallurgy. Taking a liner as typical casting, he explained the chemical and physical properties in thicknesses varying from ¾ to 4 inches and told how composition of the charge is manipulated to meet certain specifications.

Shows Testing Apparatus

A feature of the conference was a demonstration of physical testing apparatus and a demonstration of metal crystallization. These were arranged by Dr. C. W. Mason of Cornell university's chemistry department.

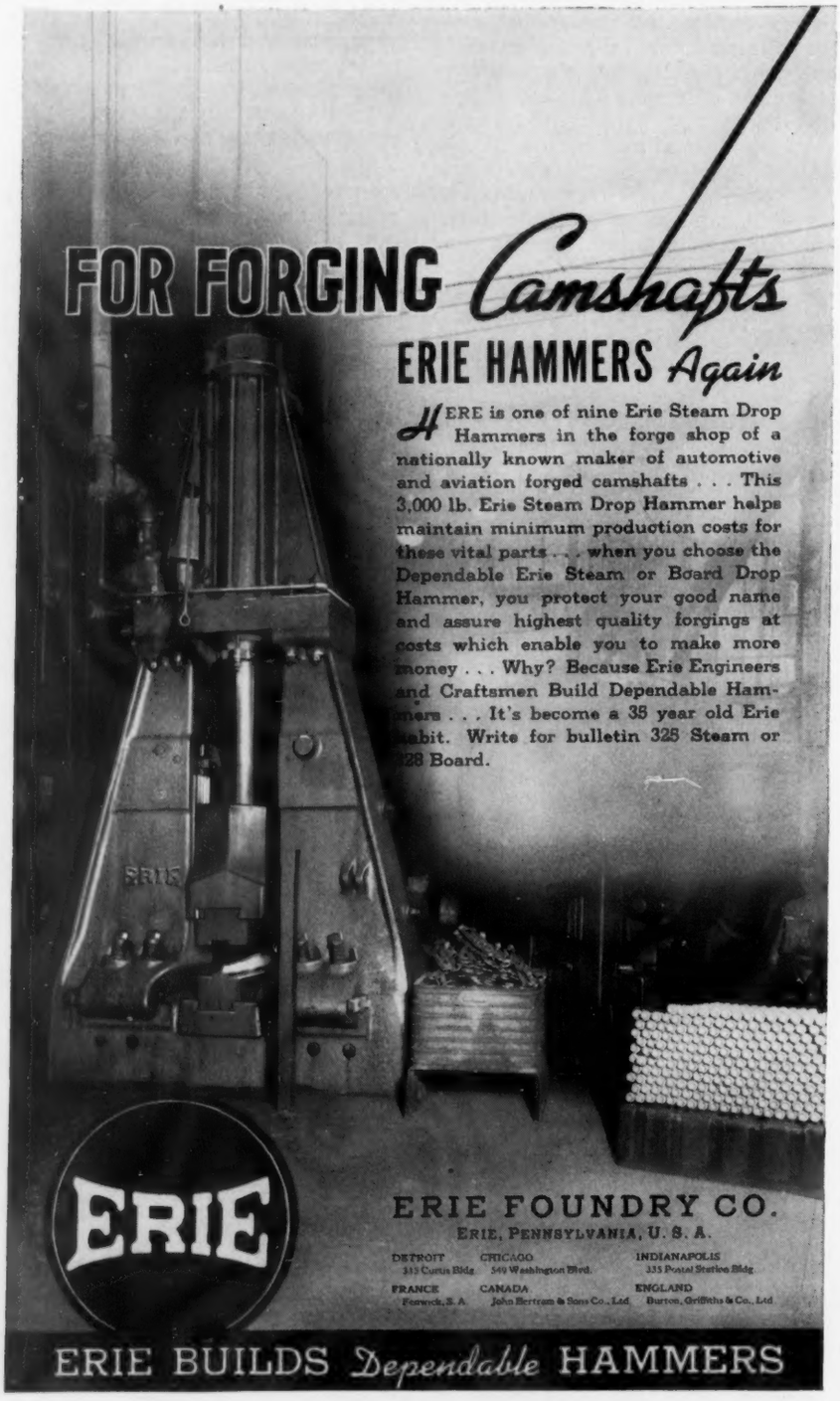
Marshall Post, president of the American Foundrymen's association, officiated as toastmaster at the banquet at which Mr. Voss spoke on industrial relations. Mr. Voss directed attention to the fact that because this nation has seen such a remarkable industrial development during the past half century, practically everything must be viewed from a new standpoint. With all these advances, he claimed we still have one vital problem which must be solved if industry is to make further progress, and that problem is the relationship between employer and employe, with the public a vitally interested third party.

Executives of large business enterprises today lack the personal con-

tact with employes which obtained in former days, hence the necessity of having a duly qualified person whose duty it shall be to learn what is on the worker's mind and to present his findings to the management. Mr. Voss made clear the fact that this man should be unbiased, which is not always the case with foremen and superintendents who conceivably might hesitate to report conditions reflecting on their managerial ability.

Touching on a recent visit to England, Mr. Voss stated that the feature of most interest to the American employer and employe in the British system of labor relations is that it is the express desire of both men and management to keep their negotiations and discussions as free as possible from government interference. In England, the government remains entirely free of labor negotiations except in the event of serious emergencies.

Interference and intrusion on the part of our government, in the opinion of the speaker, have complicated collective bargaining. In conclusion, he discussed the Wagner act and its enforcing agency, the national labor relations board, and directed attention to many features which actually defeat allegedly original intention.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Comprehensive Work on Grinding Wheel Use

■ *Grinding Wheels and Their Uses*, by Johnson Heywood; cloth, 367 pages 6 x 9 inches; published by Penton Publishing Co., Cleveland; supplied by STEEL, Cleveland, for $3; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London, S.W. 1.

This book will be found enlightening to those seeking the latest information on modern grinding practice. Shop executives can turn to it for help on everyday grinding problems; grinding machine operators, or those who aim to take up this line of work, can derive much benefit from the information presented; and students in technical and trade schools, and colleges can profit from the operating experience of engineers, designers, foremen and employes engaged in the grinding industry.

In 23 chapters covering 367 pages the author has presented a large amount of information to which many hundred men have contributed their practical and theoretical knowledge as well as descriptions of various grinding practices and methods they have found highly satisfactory. The author says: "The material in the book came from three general types of source: Engineers on the staffs of grinding wheel and grinding machine manufacturers; method engineers and designers in shops which perform grinding operations on their products; and foremen and employes of grinding departments."

Internal, cylindrical, surface, roll and cam, eccentric and other out-of-round surface grinding are treated in separate chapters. The author discusses the materials used for polishing and buffing and explains how to set up polishing wheels. Throughout the book he stresses ways in which grinding output can be stepped up and the required finish imparted at the lowest overall cost. Many production-speeding and cost-cutting methods and knacks are described. Figures are cited to prove how much the use of better methods has increased production and reduced costs.

Wheel recommendations for various types of grinding are presented in tabular form and include the kind of abrasive, grain, grade and bond for the particular material and job. The text is supplemented with data on the care and safe use of grinding wheels, wheel breakage and safety, and a glossary of trade names.

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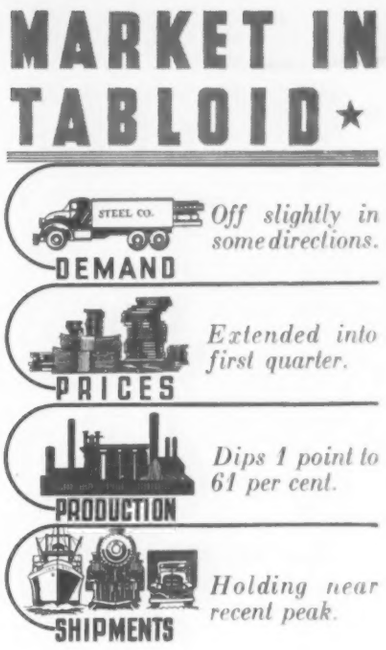
Price Extensions To Restrict Forward Commitments



■ ACTIVITY in steel markets continues to moderate gradually. Consumer pressure for delivery is less urgent, and with seasonal influences commencing to be felt, a tapering in demand and production through the year-end is not unlikely.

Decision of the industry to extend current prices into next quarter generally was looked for and will tend to stabilize orders and operations. In the absence of price advances the incentive to anticipate forward needs through heavier buying at this time has been removed. Mindful of inventories, consumers may be expected to regulate their purchases this month in line with early requirements.

Steel consumption is well sustained. Automobile production is at a new peak since August, 1937; railroad inquiries and orders are slightly heavier, while several large projects involving fabricated plates and shapes have been placed or are pending.

The present lull in steel demand as yet is small. Last week's decrease in production of 1 point to 61 per cent brought the total reduction from the second half peak to only 2 points. Since the early-November bulge in operations to a certain extent was the result of heavy forward buying of flat-rolled steel at price concessions, some compensation for this excess is regarded as a natural development.

Pig Iron Output Expands Fifth Consecutive Month

Pig iron production increased during November for the fifth consecutive month. Total output of 2,286,530 tons was 10.6 per cent ahead of October and 13.8 per cent larger than a year ago. Daily average production was 14.3 per cent larger than in October. Output the first 11 months this year was 16,676,814 tons, a decrease of 52.7 per cent from the corresponding 1937 figure.

Shipbuilding awards continue to bolster prospective business in heavy steel products. Four cargo boats placed by the maritime commission will take about 16,000 tons of hull steel. Another battleship ordered by the navy involves 11,000 tons of miscellaneous steel, in addition to a heavy tonnage of armor plate.

Still influenced by active retail demand, automobile production last week rose to 98,695 units, against 84,930 the week before, when the holiday interrupted operations. A year ago output totaled 86,848. General Motors' assemblies last week increased from 40,125 units to 44,505. Chrysler was up from 20,840 to 25,270, Ford from 14,000 to 17,850 and all others from 9965 to 11,070.

Rail inquiry is headed by 13,000 tons for the Norfolk & Western, while the Chesapeake & Ohio is expected in the market shortly for 25,000 tons. United States reclamation bureau, Denver, is inquiring for 3160 tons of rails and 1666 tons of accessories. Bessemer & Lake Erie has ordered 200 freight cars, and city of Baltimore has placed 40 trolley cars.

Structural Awards Rise On Two Large Bridge Lettings

Awards of fabricated structural steel were substantially heavier last week, principally as a result of the placing of the Narrows bridge, Tacoma, Wash., requiring 16,404 tons of shapes, reinforcing bars, cable and piling, and a Brooklyn, N. Y., bridge, taking 17,000 tons.

Lower operations at Pittsburgh and Chicago principally were responsible for the latest dip in steelmaking. The former slipped 3 points to 47 per cent, while Chicago was down 2 points at 56.5 per cent. Other districts showing decreases were Cleveland, off 5 points to 72 per cent; Wheeling, off 4 points to 62; Buffalo, off 2 points to 49.

Except for Birmingham, unchanged at 75 per cent, production was higher at other centers. Gains included 3 points in eastern Pennsylvania to 37 per cent, 2 points in New England to 76, 4 points at Youngstown to 65, 5 points at Cincinnati to 75, 2 points at Detroit to 84 and 3 points at St. Louis to 51.5.

Scrap is easier in most markets, the composite being down 21 cents to $14.75, the first drop since the first week of October. Scrap weakness also lowers the iron and steel composite 1 cent to $36.36, while the finished steel composite is unchanged at $56.50.

COMPOSITE MARKET AVERAGES

	Dec. 3	Nov. 26	Nov. 19	One Month Ago Nov., 1938	Three Months Ago Sept., 1938	One Year Ago Dec., 1937	Five Years Ago Dec., 1933
Iron and Steel	$36.36	$36.37	$36.35	$36.39	$36.48	$38.88	$31.01
Finished Steel	56.50	56.50	56.50	56.68	57.20	61.70	51.10
Steelworks Scrap..	14.75	14.79	14.79	14.58	14.23	13.24	10.12

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Dec. 3, 1938	Nov. 1938	Sept. 1938	Dec. 1937
Steel bars, Pittsburgh	2.25c	2.25c	2.25c	2.45c
Steel bars, Chicago	2.25	2.25	2.25	2.50
Steel bars, Philadelphia	2.57	2.57	2.57	2.75
Iron bars, Terre Haute, Ind	2.15	2.15	2.15	2.35
Shapes, Pittsburgh	2.10	2.10	2.10	2.25
Shapes, Philadelphia	2.215	2.215	2.215	2.465
Shapes, Chicago	2.10	2.10	2.10	2.30
Plates, Pittsburgh	2.10	2.10	2.10	2.25
Plates, Philadelphia	2.15	2.15	2.15	2.445
Plates, Chicago	2.10	2.10	2.10	2.30
Sheets, hot-rolled, Pittsburgh	2.15	2.15	2.15	2.40
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.20	3.55
Sheets, No. 24, galv., Pittsburgh	3.50	3.50	3.50	3.80
Sheets, hot-rolled, Gary	2.15	2.15	2.15	2.50
Sheets, cold-rolled, Gary	3.20	3.20	3.20	3.65
Sheets, No. 24, galv., Gary	3.50	3.50	3.50	3.90
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.90
Tin plate, per base box, Pitts.	$5.00	$5.10	$5.35	$5.35
Wire nails, Pittsburgh	2.45	2.45	2.45	2.75

Semifinished Material

Sheet bars, open-hearth, Youngs.	$34.00	$34.00	$34.00	$37.00
Sheet bars, open-hearth, Pitts.	34.00	34.00	34.00	37.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	37.00
Wire rods, No. 5 to 9/32-inch, Pitts.	43.00	43.00	43.00	47.00

Pig Iron

	Dec. 3, 1938	Nov. 1938	Sept. 1938	Dec. 1937
Bessemer, del. Pittsburgh	$22.34	$22.34	$21.84	$25.26
Basic, Valley	20.50	20.50	19.50	23.50
Basic, eastern, del. Philadelphia	22.34	22.34	21.34	25.34
No. 2 foundry, Pittsburgh	22.21	22.21	21.21	25.21
No. 2 foundry, Chicago	21.00	21.00	20.00	24.00
Southern No. 2, Birmingham	17.38	17.38	16.38	20.38
Southern No. 2, del. Cincinnati	20.89	20.89	19.89	23.89
No. 2X, del. Phila. (differ. av.)	23.215	23.125	22.215	26.215
Malleable, Valley	21.00	21.00	20.00	24.00
Malleable, Chicago	21.00	21.00	20.00	24.00
Lake Sup., charcoal, del. Chicago	28.34	28.34	28.34	30.24
Gray forge, del. Pittsburgh	21.17	21.17	20.17	24.17
Ferromanganese, del. Pittsburgh	97.77	97.77	97.77	107.49

Scrap

Heavy melting steel, Pittsburgh	$15.50	$15.15	$15.25	$13.40
Heavy melt. steel, No. 2, E. Pa.	12.75	12.75	12.75	13.13
Heavy melting steel, Chicago	14.25	14.20	13.60	12.40
Rails for rolling, Chicago	17.75	17.40	17.75	14.25
Railroad steel specialties, Chicago	16.25	16.10	16.60	15.75

Coke

Connellsville, furnace, ovens	$ 3.75	$3.75	$3.75	$4.30
Connellsville, foundry, ovens	5.00	5.00	5.00	5.25
Chicago, by-product fdry., del.	10.50	10.50	10.50	11.00

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.15c
Chicago, Gary	2.15c
Cleveland	2.15c
Detroit, del.	2.25c
Buffalo	2.15c
Sparrows Point, Md.	2.15c
New York, del.	2.39c
Philadelphia, del.	2.32c
Granite City, Ill.	2.25c
Middletown, O.	2.15c
Youngstown, O.	2.15c
Birmingham	2.15c
Pacific Coast points	2.65c

Cold Rolled

Pittsburgh	3.20c
Chicago, Gary	3.20c
Buffalo	3.20c
Cleveland	3.20c
Detroit, delivered	3.30c
Philadelphia, del.	3.52c
New York, del.	3.54c
Granite City, Ill.	3.30c
Middletown, O.	3.20c
Youngstown, O.	3.20c
Pacific Coast points	3.80c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Tin Mill Black Plate

Pittsburgh	3.15c
Chicago, Gary	3.15c
Granite City, Ill.	3.25c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.95c
Pacific Coast	4.65c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, base	2.10c
Sparrows Point, base	2.10c
Claymont, Del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c
Pittsburgh	3.35c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chgo.	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	2.25c
Chicago or Gary	2.25c
Duluth	2.35c
Birmingham	2.25c
Cleveland	2.25c
Buffalo	2.25c
Detroit, delivered	2.35c
Philadelphia, del.	2.57c
Boston, delivered	2.62c
New Cork, del.	2.59c
Gulf ports	2.60c
Pacific Coast points	2.85c

Rail Steel

To Manufacturing Trade

Pittsburgh	2.10c
Chicago or Gary	2.10c
Detroit, delivered	2.20c
Cleveland	2.10c

2¼" O. D.	13	14.54	16.76
2¼" O. D.	12	16.01	18.45
2½" O. D.	12	17.54	20.21
2¾" O. D.	12	18.59	21.42
3" O. D.	12	19.50	22.48
3½" O. D.	11	24.62	28.37
4" O. D.	10	30.54	35.20
4½" O. D.	10	37.35	43.04
5" O. D.	9	46.87	54.01
6" O. D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm..$42.00-43.00
4-in., Birmingham.. 45.00-46.00
4-in., Chicago 53.80-54.80
6-in. & over, Chicago 50.80-51.80
6-in. & over, east fdy. 46.00
Do., 4-in. 49.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Clev., Buffalo, Young., Birm., Sparrows Point..$34.00
Duluth (billets) 36.00
Detroit, delivered 36.00

Forging Quality Billets

6 x 6 to 9 x 9-in., base

Pitts., Chicago, Buffalo... 40.00
Duluth 42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago.. 34.00
Detroit, delivered 36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to $\frac{9}{32}$-inch incl. 43.00
Do., over $\frac{9}{32}$ to $\frac{11}{64}$-in. incl. 48.00
Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt. 1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur. .. $3.75
Connellsville, fdry.. 4.75- 5.50
Connell. prem. fdry. 5.75- 6.25
New River fdry. .. 6.50- 6.75
Wise county fdry... 5.50- 5.75
Wise county fur. .. 4.50- 4.75

By-Product Foundry

Newark, N. J., del. . 10.88-11.35
Chi., ov., outside del. 9.75
Chicago, del. 10.50
Milwaukee, ovens.. 10.50
New England, del... 12.50
St. Louis, del. 11.00-11.50
Birmingham, ovens. 7.00
Indianapolis, del. .. 10.00
Cincinnati, del. 9.75
Cleveland, del. 10.30
Buffalo, del. 10.50
Detroit, del. 10.25
Philadelphia, del. .. 10.65

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol ... 16.00c
Toluol, two degree 22.00c
Solvent naphtha 26.00c
Industrial xylol 26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums).. 16.25c
Do. (450 lbs.) 15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers 5.75c
Per ton, bulk, f.o.b. port
Sulphate of ammonia ...$27.50

and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off
Do., less carloads, 5 kegs or more, no discount on any extras.. $3.90
Do., under 5 kegs no disc. on any extras... $4.05

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

In.	Blk.	Galv.
Steel		
⅛	63½	54
¼	66½	58
1—3	68½	60½
Iron		
¼	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel		
2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54
Iron		
2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel	
1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

	Blk.	Galv.
Iron		
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet, f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O. D.	13	$ 9.72	$23.71
1¾" O. D.	13	11.06	22.93
2" O. D.	13	12.38	19.35
2¼" O. D.	13	13.79	21.68
2¼" O. D.	12	15.16	.....
2½" O. D.	12	16.58	26.57
2¾" O. D.	12	17.54	29.00
3" O. D.	12	18.35	31.36
3½" O. D.	11	23.15	39.81
4" O. D.	10	28.66	49.90
5" O. D.	9	44.25	73.93
6" O. D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O. D.	13	$ 7.82	$ 9.01
1¼" O. D.	13	9.26	10.67
1½" O. D.	13	10.23	11.79
1¾" O. D.	13	11.64	13.42
2" O. D.	13	13.04	15.03

Strip and Hoops

(Base, hot-rolled, 1 to 25 tons; cold-rolled, 3 to 25 tons)

Hot strip to 23⅛-in.

Pittsburgh, Chicago, Gary, Cleveland Youngstown, Middletown, Birmingham.... 2.15c
Detroit, del. 2.25c
Philadelphia, del. 2.47c
New York, del. 2.51c
Cooperage hoop, Youngs., Pitts., Chicago, Birm... 2.25c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown 2.95c
Chicago 3.05c
Detroit, del. 3.05c
Worcester, Mass. 3.15c

Carbon	Cleve. Pitts.
0.26—0.50	2.95c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass., $4 higher.

Commodity Cold-Rolled	Strip
Pitts.-Cleve.-Youngstown	3.10c
Detroit, del.	3.20c
Worcester, Mass.	3.50c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill ... $40.00
Relay rails, Pittsburgh 20—100 lbs. 32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham. $40.00
Do., rerolling quality.. 39.00

Cents per pound

Angle bars, billet, mills 2.70c
Do., axle steel 2.35c
Spikes, R. R. base 3.00c
Track bolts, base 4.15c
Car axles forged, Pitts., Chgo., B'ham. 3.15c
Tie plates, base 2.15c

Base, light rails 25 to 60 lbs.; 20 lbs. up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.

Carriage and Machine

½ x 6 and smaller ..65-5-5 off
Do. larger, to 1-in. 60-10-5 off
Do. 1⅛ and larger 60-5-5 off
Tire bolts .....50-5 off

Stove Bolts

In packages with nuts attached 75 off; in packages with nuts separate 75-12½ off; bulk 85 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts .....50-10-5-5 off
Elevator bolts ....50-10-5-5 off
Plow bolts .....65-5-5 off

Nuts

Semifinished hex. U.S.S.	S.A.E.
¼-⅞-in., incl. ..65-10	70-5
½-⅞-in., incl. ..65-5	70
⅝-1-in., incl. ...60-10	65
1⅛ and larger..60-5	60-5

Hexagon Cap Screws

Milled .....50-10-5 off
Upset, 1-in. smaller..67½-10 off

Square Head Set Screws

Upset, 1-in., smaller..75-10 off
Headless set screws....70-10 off

Rivets, Washers

Structural, Pittsburgh, Cleveland, Chicago ... 3.40c
⅛-inch and smaller, Pitts., Chi., Cleve. ..65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers

Buffalo 2.10c
Birmingham 2.10c
Gulf ports 2.45c
Pacific coast points 2.70c

Iron

Terre Haute, Ind. 2.15c
Chicago 2.15c
Philadelphia 2.47c
Pittsburgh, refined....3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Pittsburgh 2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt. 2.05c
Detroit, delivered 2.15c
Gulf ports 2.40c
Pacific coast ports, f.o.b. car docks 2.50c
Philadelphia, del. 2.22c

Rail steel, straight lengths, quoted by distributors

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birmingham.... 1.90c
Detroit, delivered 2.00c
Gulf ports 2.25c
Pacific Coast 2.35c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard wire nails.... $2.45
Cement coated nails $2.45

(Per pound)

Polished staples 3.15c
Galv. fence staples 3.40c
Barbed wire, galv. 3.20c
Annealed fence wire.... 2.95c
Galv. fence wire 3.35c
Woven wire fencing (base C. L. column) 67.00
Single loop bale ties, (base C. L. column) .. 56.00

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire.. 2.60c
Galvanized wire 2.65c
Spring wire 3.20c
Worcester, Mass., $2 higher on bright basic and spring wire.
Cut nails, C. L. Pitts. (10% disc. on all extras) $3.60

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.70c	3.40c
Chicago	2.70c	3.40c
Gary, Ind.	2.70c	3.40c
Detroit	2.75c	*3.50c
Cleveland	2.70c	3.40c
Buffalo	2.70c	3.40c

* Delivered.

Alloy Bars (Hot)

(Base, 3 to 25 tons)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.80c
Detroit, delivered 2.90c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200....	1.35
2300	1.55	3300....	3.80
2500	2.25	3400....	3.20
4100	0.15 to 0.25 Mo.		0.55
4600	0.20 to 0.30 Mo. 1.50-2.00 Ni.		1.10
5100	0.80-1.10 Cr.		0.45
5100 Cr. spring flats			0.15
6100 bars			1.20
6100 spring flats			0.85
Cr. N., Van.			1.50
Carbon Van.			0.85
9200 spring flats			0.15
9200 spring rounds, squares			0.40

Electric furnace up 50 cents.

Piling

Pittsburgh 2.40c
Chicago, Buffalo 2.40c
Gulf ports 2.75c

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$22.00	$22.50	$21.50	$23.00
Birdsboro, Pa.	22.00	22.50	21.50	23.00
Birmingham, Ala.‡	17.38	.....	16.38	22.00
Buffalo	21.00	21.50	20.00	22.00
Chicago	21.00	21.00	20.50	21.50
Cleveland	21.00	21.00	20.50	21.50
Detroit	21.00	21.00	20.50	21.50
Duluth	21.50	21.50	.....	22.00
Erie, Pa.	21.00	21.50	20.50	22.00
Everett, Mass.	22.75	23.25	22.25	23.75
Granite City, Ill.	21.00	21.00	20.50	21.50
Hamilton, O.	21.00	21.00	20.50	.....
Neville Island, Pa.	21.00	21.00	20.50	21.50
Provo, Utah	19.00	.....	.....	.....
Sharpsville, Pa.	21.00	21.00	20.50	21.50
Sparrow's Point, Md.	22.00	.....	21.50	.....
Swedeland, Pa.	22.00	22.50	21.50	23.00
Toledo, O.	21.00	21.00	20.50	21.50
Youngstown, O.	21.00	21.00	20.50	21.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:

Akron, O., from Cleveland	22.39	22.39	21.89	22.89
Baltimore from Birmingham	22.78	.....	21.66	.....
Boston from Birmingham	22.87	.....	.....	.....
Boston from Everett, Mass.	23.25	23.75	22.75	24.25
Boston from Buffalo	23.25	23.75	22.75	24.25
Brooklyn, N. Y., from Bethlehem	24.50	25.00	.....	.....
Canton, O., from Cleveland	22.39	22.39	21.89	22.89
Chicago from Birmingham	†21.22	.....	.....	.....
Cincinnati from Hamilton, O.	21.44	22.11	21.61	.....
Cincinnati from Birmingham	21.06	.....	20.06	.....
Cleveland from Birmingham	21.32	.....	20.82	.....
Mansfield, O., from Toledo, O.	22.94	22.94	22.44	22.44
Milwaukee from Chicago	22.10	22.10	21.60	22.60
Muskegon, Mich., from Chicago, Toledo or Detroit	24.19	24.19	23.69	24.69
Newark, N. J., from Birmingham	23.15	.....	.....	.....
Newark, N. J., from Bethlehem	23.53	24.03	.....	.....
Philadelphia from Birmingham	22.46	.....	21.96	.....
Philadelphia from Swedeland, Pa.	22.84	23.34	22.34	.....
Pittsburgh district from Neville Island	{ Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	23.45	23.45	22.95	22.95

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	21.50	21.50	21.00	.....
St. Louis from Birmingham	†21.12	.....	20.62	.....
St. Paul from Duluth	23.63	23.63	.....	24.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $26.50, base; $27.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$20.50	Lake Superior fur.	$25.00
Pitts. dist. fur.	20.50	do., del. Chicago	28.34
		Lyles, Tenn.	23.50

Silvery†

Jackson count, O., base: 6-6.50 per cent $25.50; 6.51-7—$26.00; 7-7.50—$26.50; 7.51-8—$27.00; 8-8.50—$27.50; 8.51-9—$28.00; 9-9.50—$28.50; Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3% $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	56.05
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickset magnesite grains, f.o.b. Chewelah, Wash., net ton, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$23.50-24.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail $20, barge	$22.00
No. 2 lump	22.00-23.00

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd. $92.50; Do., del. Pittsburgh 97.77

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 28.00; Do., New Orleans 28.00; Do., 26-28%, Palmerton 33.00

Ferrosilicon, 50% freight allowed, c.l. 69.50; Do., ton lot 80.50; Do., 75 per cent 126.00; Spot, $5 a ton higher.

Silicoman, 2½ carbon 97.75; 2% carbon 102.75 1%, 112.75 Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.60-1.65

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del. carlots 10.50c; Do., ton lots 11.25c; Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained chrome 16.50c; Do., ton lots 17.25c; Do., less-ton lots 17.50c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.50c
1% carb.	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40%, lb. con. ti., ton lots 1.23; Do., less-ton lots 1.25; 20-25% carbon, 0.10 max., ton lots, lb. 1.35; Do, less-ton lots 1.40

Spot 5c higher

Ferrocolumbium, 50-55%, contract, lb. con. col., f.o.b. Niagara Falls 2.25; Do, less-ton lots 2.30

Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton 142.50; Do, spot 145.00; Do, contract, ton lots 145.00; Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50; Do, spot 160.00; Do, contract, ton lots 160.00; Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c; Do, ton lots 8.00c; Do, less-ton lots 8.50c

Spot ½c lb. higher

Chromium Briquets, contract carloads, freight allowed, lb. 7.25c; Do, spot carlots, bulk 7.50c; Do, ton lots 8.00c; Do, less-ton lots 8.50c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. 2.05; Do, smaller lots 2.15

Vanadium Pentoxide, contract, lb. contained 1.10; Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c; Do, spot 85.00c

88% chrome, contract 79.00c; Do, spot 84.00c

Silicon Metal, 1% iron, contract, lb. 14.50c; Do, 2% 13.00c

Spot ¼c higher

Silicon Briquets, contract, carloads, freight allowed, ton $69.50; Carload, spot 74.50; Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, freight allowed lb. 4.75c; Ton lots 5.25c; Less-ton lots 5.50c

Spot ¼c higher

Zirconium Alloy, 12-15%, carloads, gross ton $97.50; Do, spot 102.50

34-40%, contract, carloads, lb., alloy 14.00c; Do, ton lots 15.00c; Do, less-ton lots 16.00c

Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60; Do, 100-200 lb. lots 2.75; Do, under 100-lb. lots 3.00

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled	Sheets Cold Rolled	Sheets Galv. No. 24
Boston	3.98	4.21	5.21	3.85	3.85	5.66	3.86	4.93	4.76
New York (Metropolitan)	3.94	4.11	4.11	3.76	3.75	5.56	3.73	4.90	4.40
Philadelphia	3.60	3.60	4.10	3.40	3.40	5.00	3.40	....	4.50
Baltimore	3.80	3.95	4.35	3.65	3.65	5.00	3.70	5.05	4.30
Norfolk, Va.	4.00	4.15	4.55	3.85	3.85	5.20	3.90	4.80	5.40
Buffalo	3.60	3.97	3.97	3.77	3.55	5.40	3.50	4.55	4.40
Pittsburgh	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.60	4.50
Cleveland	3.50	3.65	3.65	3.55	3.73	5.33	3.50	4.70	4.62
Detroit	3.68	3.83	3.83	3.75	3.80	5.42	3.58	4.65	4.74
Cincinnati	3.85	3.82	3.82	3.80	3.83	5.43	3.57	....	4.57
Chicago	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.45	4.50
Minneapolis	3.85	4.00	4.00	3.80	3.80	5.40	3.75	5.10	4.75
Milwaukee	3.73	3.88	3.88	3.68	3.68	5.28	3.63	4.58	4.63
St. Louis	3.87	4.02	4.02	3.82	3.82	5.42	3.77	4.72	4.77
Kansas City	4.15	4.30	4.30	4.10	4.10	5.70	4.10	.	4.75
Memphis	4.01	4.16	4.16	3.96	3.96	5.71	3.91	.	5.26
Chattanooga	3.90	4.05	4.05	3.85	3.85	5.80	3.80	..	4.40
Tulsa, Okla.	4.64	4.79	4.79	4.59	4.59	6.19	4.54	..	5.54
Birmingham, Ala.	3.50	3.65	3.65	3.45	3.45	5.83	3.40	..	4.75
New Orleans	3.85	4.65	4.65	3.80	3.80	5.75	4.10	...	4.60
Houston, Tex.	3.50	5.85	6.25	4.05	4.05	5.65	4.20	..	5.25
Seattle	4.30	4.50	5.85	4.05	4.15	5.90	4.20	....	5.50
Portland, Oreg.	4.30	4.70	6.10	4.15	4.15	5.90	3.75	6.50	4.75
Los Angeles	4.00	4.50	6.35	4.00	4.00	6.20	4.20	6.30	5.05
San Francisco	4.05	4.45	6.00	3.85	3.95	5.45	4.00	6.40	5.15

	Cold Rolled Strip	Cold Finished Bars	SAE Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series	SAE Cold Drawn Bars 2300	SAE Cold Drawn Bars 3100
Boston	3.61	4.43	4.28	7.65	6.25	6.00	8.05	8.73	7.33
New York	3.66	4.39	4.14	7.50	6.10	5.85	....	8.69	7.29
Philadelphia	3.66	4.36	3.85	7.46	6.06	5.81	8.71	....	....
Baltimore	.	4.35	3.95	....	....	....	....	....	....
Norfolk, Va.	..	4.60	....	....	....	....	....	....	....
Buffalo	3.57	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Pittsburgh	3.35	3.95	3.80	7.35	5.95	5.70	7.75	8.35	6.95
Cleveland	3.35	4.05	3.70	7.45	6.05	6.05	7.85	8.25	6.85
Detroit	3.55	4.10	3.83	7.57	6.17	5.92	7.39	8.55	7.15
Cincinnati	3.60	4.30	3.90	7.59	6.19	5.94	8.99	8.60	7.20
Chicago	3.65	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Minneapolis	..	4.64	4.00	7.60	6.20	8.79	9.34	8.94	7.54
Milwaukee	...	4.18	3.93	7.48	6.08	5.83	7.88	8.48	7.08
St. Louis	3.76	4.32	4.07	7.62	6.22	5.97	8.02	8.62	7.22
Kansas City	4.46	4.60	....	....	....	....	....	....	....
Memphis	.	4.61	....	....	....	....	....	....	....
Chattanooga	.	4.90	....	....	....	....	....	....	....
Tulsa, Okla.	.	5.09	.	....	....	....	....	....	....
Birmingham, Ala.	..	4.73	....	....	....	....	....	....	....
New Orleans	5.00	5.10	.	....	....	....	....	....	....
Seattle	.	5.60	5.65	..	7.80	7.65	8.45	..	....
Portland, Oreg.	.	5.60	6.10	9.00	8.00	7.85	8.70	....	....
Los Angeles	4.45	6.60	4.65	9.40	8.55	8.40	9.05	10.40	9.55
San Francisco	*9.30	6.55	5.20	9.65	8.80	8.65	9.30	10.65	9.80

* Based on minimum quantity.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, Dec. 1

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, gross tons: Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si...	$25.74 5 10 0	$17.47	2 1 0
Basic bessemer	....	16.40	1 18 6
Hematite, Phos. .03-.05	30.42 6 10 0*	.....	.....
Billets	$36.86 7 17 6	$42.60	5 0 0
Wire rods, No. 5 gage	52.77 11 5 6	43.66	5 2 6
Standard rails	$47.39 10 2 6	$48.99	5 15 0
Merchant bars	2.30c 11 0 0	2.00c to 2.05c	5 2 6 to 5 5 0
Structural shapes	2.22c 10 12 6	1.90c	4 17 6
Plates, †¼ in. or 5 mm.	2.42c 11 11 3	2.19c to 2.39c	5 12 6 to 6 2 6
Sheets, black, 24 gage or 0.5 mm	2.72c 13 0 0	2.93c	7 10 0^
Sheets, gal., 24 ga., corr.	3.29c 15 15 0	3.41c	8 15 0
Bands and strips	2.77c 13 5 0	2.05c	5 5 0
Plain wire, base	4.08c 19 10 0	2.39c to 2.83c	6 2 6 to 7 5 0
Galvanized wire, base	4.86c 23 5 0	3.07c to 3.17c	7 17 6 to 8 2 6
Wire nails, base	3.87c 18 10 0	2.73c to 2.93c	7 0 0 to 7 10 0
Tin plate, box 108 lbs.	$ 4.74 1 0 3	.....	.....

British ferromanganese $92.50 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French Francs		Belgian Francs		Reich Mark
Fdy. pigiron, Si.2.5..	$25.51	5 9 0(a)	$15.73	598	$16.90	500	$25.24	63
Basic bess. pigiron..	23.40	5 0 0(a)	.....	.....	.....	.....	27.85	(b)59.50
Furnace coke	6.44	1 7 6	5.39	205	7.27	215	7.61	19
Billets	36.86	7 17 6	22.09	840	29.07	860	38.67	96.50
Standard rails	2.12c	10 2 6	1.38c	1,150	2.06c	1,375	2.38c	132
Merchant bars	2.56c	12 4 0††	1.30c	1,080	1.65c	1,100	1.98c	110
Structural shapes	2.30c	11 0 6††	1.27c	1,055	1.65c	1,100	1.93c	107
Plates, †¼-in. or 5 mm	2.45c	11 14 3††	1.62c	1,350	2.06c	1,375	2.29c	127
Sheets, black	3.29c	15 15 0§	1.92c	1,600‡	2.36c	1,575‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	3.87c	18 10 0	2.70c	2,250	4.13c	2,750	6.66c	370
Plain wire	4.08c	19 10 0	1.98c	1,650	2.48c	1,650	3.11c	173
Bands and strips	2.71c	12 19 0††	1.45c	1,210	1.95c	1,300	2.29c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. ^Close annealed ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 75.25 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	†12.00
Bos. dock No. 1 exp.	13.00-13.25
New Eng. del. No. 1	13.00
Buffalo, No. 1	14.00-14.50
Buffalo, No. 2	12.00-12.50
Chicago, No. 1	14.00-14.50
Chicago, auto, no alloy	13.00-13.50
Chicago, No. 2 auto	11.50-12.00
Cincinnati, dealers	12.00-12.50
Cleveland, No. 1	13.50-14.00
Cleveland, No. 2	12.50-13.00
Detroit, No. 1	10.00-10.50
Detroit (industrial)	10.75-11.25
Eastern Pa., No. 1	14.50-15.00
Eastern Pa., No. 2	12.50-13.00
Federal, Ill.	12.50-13.00
Granite City, R. R.	13.25-13.75
Granite City, No. 2	12.25-12.75
Los Angeles, No. 1	13.50-14.00
Los Angeles, No. 2	12.50-13.00
N. Y. dock No. 1 exp.	11.50-12.00
Pitts., No. 1 (R.R.)	16.00-16.50
Pittsburgh, No. 1	15.50-16.00
Pittsburgh, No. 2	14.50-15.00
St. Louis, R. R.	13.00-13.50
St. Louis, No. 2	12.00-12.50
San Francisco, No. 1	12.00
Seattle, No. 1	12.00-13.00
Toronto, dlrs. No. 1	10.00-11.00
Valleys, No. 1	14.50-15.00

COMPRESSED SHEETS

Buffalo	12.00-12.50
Chicago, factory	13.00-13.50
Chicago, dealer	12.00-12.50
Cincinnati, del.	11.50-12.00
Cleveland	13.00-13.50
Detroit	11.75-12.25
E. Pa., new mat.	14.50-15.00
E. Pa., old mat.	10.50-11.00
Los Angeles	12.50-13.00
Pittsburgh	15.50-16.00
St. Louis	11.00-11.50
Valleys	14.00-14.50

BUNDLED SHEETS

Buffalo, No. 1	12.00-12.50
Buffalo, No. 2	11.00-11.50
Cleveland	10.00-10.50
Los Angeles	14.00
Pittsburgh	14.50-15.00
St. Louis	8.00- 8.50
Toronto, dealers	4.00

SHEET CLIPPINGS, LOOSE

Chicago	8.50- 9.00
Cincinnati, dealers	7.25- 7.75
Detroit	8.75- 9.25
†Los Angeles	3.75- 4.00
St. Louis	7.50- 8.00

BUSHELING

Buffalo, No. 1	12.00-12.50
Chicago, No. 1	12.50-13.00
Cincin., No. 1, deal.	8.25- 8.75
Cincinnati, No. 2	4.00- 4.50
Cleveland, No. 2	7.25- 7.75
Detroit, No. 1, new	10.00-10.50
Valleys, new, No. 1	13.50-14.00
Toronto, dealers	4.00

MACHINE TURNINGS (Long)

Birmingham	†4.50- 5.00
Buffalo	7.00- 7.50
Chicago	7.75- 8.25
Cincinnati, dealers	5.75- 6.25
Cleveland	7.00- 7.50
Detroit	5.75- 6.25
Eastern Pa.	8.50- 9.00
Los Angeles	4.00- 4.25
New York	†3.50- 4.00
Pittsburgh	10.00-10.50
St. Louis	5.00- 5.50
Toronto, dealers	4.25- 4.75
Valleys	8.50- 9.00

SHOVELING TURNINGS

Buffalo	8.50- 9.00
Cleveland	7.50- 8.00
Chicago	8.50- 9.00
Detroit	6.75- 7.25
Pitts., alloy-free	11.25-11.75

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	2.00
Buffalo	7.25- 7.50
Cincinnati, dealers	4.50- 5.00
Cleveland	7.50- 8.00
Eastern Pa.	6.50- 7.00
Detroit	5.75- 6.25
New York	†2.50- 3.00
Pittsburgh	8.25- 8.75
Toronto, dealers	3.50

AXLE TURNINGS

Boston district	†7.50
Buffalo	9.50-10.00
Chicago, elec. fur.	13.50-14.00
East. Pa., elec. fur.	13.00-13.50
St. Louis	9.00- 9.50
Toronto	5.00

CAST IRON BORINGS

Birmingham	†6.00- 6.50
Boston dist. chem.	†6.00- 6.25
Buffalo	8.00- 8.50
Chicago	5.50- 6.00
Cincinnati, dealers	4.50- 5.00
Cleveland	7.25- 7.75
Detroit	5.75- 6.25
E. Pa., chemical	10.00-11.00
New York	†3.50- 4.00
St. Louis	2.00- 3.00
Toronto, dealers	3.50

RAILROAD SPECIALTIES

Chicago	16.00-16.50

ANGLE BARS—STEEL

Chicago	15.50-16.00
St. Louis	15.00-15.50

SPRINGS

Buffalo	16.00-16.50
Chicago, coil	17.00-17.50
Chicago, leaf	16.00-16.50
Eastern Pa.	16.50-17.00
Pittsburgh	16.75-17.25
St. Louis	15.50-16.00

STEEL RAILS, SHORT

Birmingham	†12.00-12.50
Buffalo	17.00-17.50
Chicago (3 ft.)	15.50-16.00
Chicago (2 ft.)	16.00-16.50
Cincinnati, dealers	17.25-17.75
Detroit	16.50-17.00
Los Angeles	15.00-17.50
Pitts., 3 ft. and less	16.75-17.25
St. Louis, 2 ft. & less	15.00-15.50

STEEL RAILS, SCRAP

Boston district	†13.50-14.00
Buffalo	16.00-16.50
Chicago	14.00-14.50
Cleveland	17.00-17.50
Pittsburgh	16.25-16.75
St. Louis	14.00-14.50
Seattle	16.00

FROGS, SWITCHES

Chicago	14.00-14.50
St. Louis, cut	14.25-14.75

ARCH BARS, TRANSOMS

St. Louis	14.50-15.00

PIPE AND FLUES

Chicago, net	9.50-10.00
Cincinnati, dealers	7.25- 7.75

RAILROAD GRATE BARS

Buffalo	10.00-10.50
Chicago, net	9.00- 9.50
Cincinnati, dealers	7.00- 7.50
Eastern Pa.	13.50
New York	†8.50- 9.00
St. Louis	9.00- 9.50

RAILROAD WROUGHT

Birmingham	†11.00-11.50
Boston district	†9.50-10.00
Eastern Pa., No. 1	15.00-15.50
St. Louis, No. 1	10.75-11.25
St. Louis, No. 2	13.25-13.75
Toronto, No. 1 dlr.	10.00

FORGE FLASHINGS

Boston district	†7.75- 8.00
Buffalo	12.00-12.50
Cleveland	11.50-12.00
Detroit	9.50-10.00
Los Angeles	9.00
Pittsburgh	14.50-15.00

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	16.50-17.00

LOW PHOSPHORUS

Buffalo, crops	16.50-17.00
Cleveland, crops	18.00-18.50
Eastern Pa., crops	16.50-17.00
Pitts., billet, bloom, slab crops	18.50-19.00

LOW PHOS. PUNCHINGS

Buffalo	15.50-16.00
Chicago	16.00-16.50
Eastern Pa.	17.00-17.50
Pittsburgh	17.25-17.75
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	†14.00-15.00
Boston	15.00-15.50
Chicago	17.50-18.00
New York	†15.00-15.50
Eastern Pa.	17.00-17.50
St. Louis	18.00-18.50

STEEL CAR AXLES

Birmingham	†15.00-16.00
Buffalo	16.50-17.00
Boston district	†16.00
Chicago, net	19.00-19.50
Eastern Pa.	21.50-22.50
St. Louis	18.50-19.00

LOCOMOTIVE TIRES

Chicago (cut)	16.00-16.50
St. Louis, No. 1	13.50-14.00

SHAFTING

Boston district	†14.75-15.00
New York	†15.00-15.50
Eastern Pa.	19.50-20.00
St. Louis, 1¼-3¾"	17.00-17.50

CAR WHEELS

Birmingham	†13.50-14.00
Boston dist., iron	†11.00
Buffalo, steel	16.50-17.00
Chicago, iron	14.00-14.50
Chicago, rolled steel	15.50-16.00
Cincin., iron, deal.	14.00-14.50
Eastern Pa., iron	16.50-17.00
Eastern Pa., steel	16.50-17.00
Pittsburgh, iron	15.00-15.50
Pittsburgh, steel	16.75-17.25
St. Louis, iron	14.00-14.50
St. Louis, steel	15.00-15.50

NO. 1 CAST SCRAP

Birmingham	†12.50-13.00
Boston, No. 1 mach.	†11.00-11.50
N. Eng. del. No. 2	12.00-12.50
N. Eng. del. textile	12.50-13.00
Buffalo, cupola	14.50-15.00
Buffalo, mach.	15.50-16.00
Chicago, agri. net	10.50-11.00
Chicago, auto net	12.00-12.50
Chicago, railr'd net	11.00-11.50
Chicago, mach. net	12.00-12.50
Cincin., mach. deal.	14.00-14.50
Cleveland, mach. net	16.75-17.25
Eastern Pa., cupola	16.50-17.00
E. Pa., mixed yard	14.50-15.00
Los Angeles, net	13.50-14.00
Pittsburgh, cupola	15.25-15.75
San Francisco, del.	13.50-14.00
Seattle	10.00-12.00
St. Louis, cupola	12.50-13.00
St. L., agr. mach.	12.75-13.25
St. L., No. 1 mach.	14.00-14.50
Toronto, No. 1, mach., net	11.00-12.00

HEAVY CAST

Boston dist. break.	†10.75-11.00
New England, del.	12.50-13.00
Buffalo, break.	11.00-11.50
Cleveland, break. net	13.00-13.50
Detroit, auto net	12.50-13.00
Detroit, break	9.50-10.00
Eastern Pa.	16.00
Los Ang., auto, net	13.00-13.50
New York, break.	†11.50-12.00
Pittsburgh, break.	13.25-13.75

STOVE PLATE

Birmingham	†7.50- 8.00
Boston district	†8.00- 8.25
Buffalo	13.00-13.50
Chicago, net	8.50- 9.00
Cincinnati, dealers	7.25- 7.75
Detroit, net	8.50- 9.00
Eastern Pa.	13.50-14.00
New York, fdy.	†10.00-10.50
St. Louis	8.00- 8.50
Toronto dealers, net	7.50- 8.00

MALLEABLE

Birmingham, R. R.	†10.50-11.00
New England, del.	14.50-15.00
Buffalo	13.50-14.00
Chicago, R. R.	15.00-15.50
Cincin., agri. deal.	12.50-13.00
Cleveland, rail	15.00-15.50
Eastern Pa., R. R.	15.50-16.00
Los Angeles	17.50-18.00
Pittsburgh, rail	14.25-14.75
St. Louis, R. R.	12.00-13.00

Iron Ore

Lake Superior Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbess.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbess.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-9.25
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, c.i.f. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	12.00
Swedish low phos.	12.00
Spanish No. Africa basic, 50 to 60% nom.	nom.
Tungsten. sh. ton. unit, duty pd. nom.	$20.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$23.00-24.00
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52% nom.	32.00
So. African, 50-52% nom.	32.00
Indian, 50-52%	Nominal

Sheets

Sheet Prices, Page 80

Pittsburgh—Sheet mill operations have leveled off, common and full-finished production holding around 65 per cent. The recent downward trend in galvanized has halted at 60 per cent. Forward buying is absent, previous coverage and the inventory period inducing most consumers to await the turn of the year before re-entering the market. Some automotive interests, however, are expected to place new business this month. Current prices have been reaffirmed for first quarter.

Cleveland—Sheet orders have receded noticeably, declining below former estimates of most sellers. Reaffirmation of prices for first quarter precludes possibility of heavy forward buying at this time. November shipments were the best this year. Most producers are confident of clearing their books of most of the low-price tonnage before Jan. 1, although some carryover seems inevitable.

Chicago—Automotive sheet specifications are leveling off, but mills will find difficulty in completing shipment of all tonnage on books before Jan. 1. Delivery of some material is expected to extend into January. New business continues quiet although resumption of automotive buying is looked for before the end of the year.

New York—New sheet buying is light, and with a number of users still drawing on tonnage placed several weeks ago at concession, little improvement is looked for until after inventory season. Prices are being extended for first quarter.

Philadelphia — Sheet mill operations continue active, but new orders are light and with prices being extended unchanged through first quarter, there is no occasion for consumers to anticipate forward needs. Leading producers are sold up for the remainder of the year on most grades and beyond in some instances.

Buffalo — Sheet production at 65 per cent holds around the best level of the current recovery, aided by heavier automotive orders. Miscellaneous demand is steady, largely releases against orders. Consumers generally anticipate no increase in first quarter prices and are refraining from forward buying.

Birmingham, Ala.—Sustained production in sheets continues with mills still on almost a 100 per cent basis and orders in considerable volume are expected to keep production around its present level into next year.

St. Louis — New sheet buying has declined, but November shipments were well above October and a year ago. Heavy backlogs assure active operations through December. Extension of present prices into first quarter is expected to hold down new business this month.

Strip

Strip Prices, Page 81

Pittsburgh—The recent rise in strip production has been halted, at least for the present, with output of both hot and cold material holding at slightly less than 60 per cent. New business is slow, but shipments against old orders remain heavy.

New York—Cold-rolled strip buying has slackened further, with consumers pressing for delivery against old orders. Most mills have sufficient backlogs to warrant high finishing operations at the present rate the remainder of the year. Consumption is holding well and little material is being stocked ex-

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cept in the case of low-price tonnage booked several weeks ago.

Birmingham, Ala.—Strip production continues on an extremely moderate basis, with demand slight. New buying is scarce.

Plates

Plate Prices, Page 80

Pittsburgh — Prospective plate business is aided by public works, armament and barge building programs. Barge construction currently is somewhat less active, but plans are expected to be released early next year calling for the building of a substantial number of units.

Cleveland — November plate shipments were moderately ahead of October, but inquiries point to no large gains soon. Better demand for freight car building and repairs is expected to appear next quarter. Current plate prices are being extended into next quarter.

Chicago — Plate demand shows little change, the tendency being slightly downward. Needs of tank fabricators have tapered, but public works projects are taking sustained tonnages. Freight car building holds promise of moderately heavier demand.

New York—November was a dull month for plate sellers and little improvement is seen for December. Except for the placing here of steel for the 1000 box cars to be built by American Car & Foundry Co. for the Illinois Central, railroad demand is light. Tank and boiler work is spotty and current ship orders are confined principally to miscellaneous repairs. Oil company buying is fair.

Philadelphia — About 16,000 tons of hull steel, principally plates, will be required for four C-3 boats placed by the maritime commission with Sun Shipbuilding & Dry Dock Co., Chester, Pa. This brings the commission's awards so far this year to 47. Three additional boats are expected to be placed shortly for the Mississippi Shipping Co., New Orleans.

New York Shipbuilding Corp. has been awarded the construction of a battleship, requiring 11,000 tons of miscellaneous steel, plus a heavy tonnage of armor plate.

Plate business in November was generally disappointing to producers and little real improvement is now expected before the turn of the year. Buying by boiler makers still lags. Eastern producers indicate they will follow the leading Pittsburgh producer in extending prices for first quarter.

Birmingham, Ala. — Output of plate is holding steady, spurred by new railroad buying and scattered orders from other sources.

San Francisco — Estimates are that 2450 tons of plates will be required for 7.2 miles of pipe for the Los Angeles water district to be bid Dec. 12. Alternate bids will be taken on precast concrete pipe requiring 400 tons of sheets and 1420 tons of reinforcing material. Ship work at Pacific coast navy yards, on which bids were opened recently, will take 2784 tons of plates, sheets and strip.

Seattle — Only small projects are up for bids, with shops generally on reduced schedules. Largest pending item is 850 tons for the survey steamer EXPLORER, general contract awarded at Seattle. Bids are in on 1504 tons of plates and shapes for the U.S.S. MONSSEN, being built at the Puget Sound navy yard.

Plate Contracts Placed

510 tons, for 24 and 30-inch pipe, Battle Creek, Mich., to American Rolling Mill Co., Middletown, O.

Plate Contracts Pending

2450 tons, 22 to 37-inch welded steel pipe, metropolitan water district, Los Angeles, alternate bids on 21 to 36-inch precast reinforced concrete pipe, involving 400 tons of sheets; bids Dec. 12.

100 tons or more, two welded steel oil barges, 32 x 100 feet, United States engineer, Galveston, Tex.; bids Dec. 16, pro. 103.

Unstated tonnage, 150,000-gallon elevated steel water tank, Fitzsimmons general hospital, Denver; bids Dec. 6.

Bars

Bar Prices, Page 80

Pittsburgh—Bar orders are holding well. Miscellaneous users are more active, and automotive releases are steady. A tendency for demand to level off is regarded as due to seasonal factors. Purchases in a number of cases are for delivery after Jan. 1, indicating the effect of state inventory taxes. Best demand for cold-finished bars continues to come from automotive interests, although general manufacturing orders are more numerous. Inquiry is good.

Cleveland — Activity in bars is receding slightly. Automotive needs continue outstanding, while requirements of farm and road equipment builders are seasonally slow. November shipments were moderately ahead of October, but the December outlook is for a gradual letdown in new business. As anticipated, first quarter prices are unchanged.

Chicago — While bar demand no longer is rising, automotive needs are maintained. Pressure for delivery is less urgent, however. Reaffirmation of prices for first quarter is thought likely to result in unhurried ordering of bars the next 30 days, with prospects bright for an upturn after the first of the year. Farm equipment requirements are fair, while miscellaneous demand is off slightly.

New York — Bar demand has leveled off, although releases from automotive accessory makers and government shops are holding. Improvement in railroad buying so far has been disappointing.

Philadelphia — Commercial bar business is spotty, with needs of auto partsmakers outstanding. Railroad demand is light, and small forging shops are taking less tonnage than anticipated. Releases from machine tool builders also are disappointing.

Buffalo—Bar demand is sustained, aided by fairly heavy automotive orders and expanding needs for structural work. Production is holding around 60 per cent.

Birmingham, Ala.—A substantial increase from diversified buyers, particularly from farm implement manufacturers, has pushed bar production up to the 60 per cent level and continued improvement into the first quarter of the year is expected.

Pipe

Pipe Prices, Page 81

Cleveland—November shipments of standard steel pipe out of jobbers' stocks were the best this year, but a slight decrease is indicated for December. Cast pipe is more active. Shullo Construction Co., Akron, O., is low on 900 tons for that city, while a number of smaller projects are active. With PWA work appearing in substantial volume, the outlook for the next few months is more encouraging. Prices of cast and steel pipe are steady.

Chicago — Contractors' bids have been opened on numerous PWA projects involving cast iron pipe, and awards are expected by mid-December. Tonnage pending for various public works is substantial, with plans being pushed by necessity of starting work before the Jan. 1 deadline. Pipe requirements elsewhere are light.

Birmingham, Ala.—Pipe plants are on a basis of four days a week and report consistently steady lettings of small lots. Producers believe the present rate will be sufficient to hold production on approximately a four-day-a-week basis for 60 days or more.

San Francisco—Largest cast pipe

inquiry in nearly six months is 2713 tons of 16 and 18-inch iron or steel pipe for Corvallis, Oreg. Awards are small, with bookings for the year to date totaling 29,542 tons, against 25,943 tons a year ago. Several fairly large tonnages are pending.

Seattle — Pending business in cast iron pipe expected to close shortly includes 275 tons for Seattle and 300 tons for Sweet Home, Oreg. Several other large but unstated tonnages are required for various projects in Oregon. Selah, Wash., has PWA approval for a $34,000 project.

Cast Pipe Placed

825 tons, extension to water distribution system, Akron, O., to J. B. Clow & Son Co., Cleveland; bids Nov. 21.

510 tons, 24 and 30-inch pipe, Battle Creek, Mich. to American Rolling Mill Co., Middletown, O.

Cast Pipe Pending

2713 tons, 16 and 20-inch, cast iron or steel pipe, Corvallis, Oreg.; bids Dec. 19.

900 tons, 24 and 30-inch, repairs to water distribution system, Akron, O.; Shullo Construction Co., Akron, low; bids Dec. 1.

415 tons, 2 to 8-inch, Laguna Beach, Calif.; tentative bids Dec. 17.

300 tons, water system Sweet Home, Oreg.; Johnson Construction Co., Vancouver, Wash., general contractor.

300 tons, water distribution system, Westmansfield, O.; H. E. Baker, Whatton, O., low.

150 tons, water distribution system, Amsterdam, O., to be rebid soon.

150 tons, sewer department project, Akron, O.; bids Dec. 5.

Unstated tonnage, extension project, La Grande, Oreg.; J. A. Terteling & Son, Boise, Idaho, general contractor.

Wire

Wire Prices, Page 81

Cleveland — Manufacturers' wire demand continues to reflect active consumption by automotive parts interests. Other users also have entered the market for encouraging lots recently. Merchant items are seasonally dull, most jobbers attempting to hold off buying until January. American Steel & Wire Co., Cleveland, has reaffirmed prices for first quarter.

Birmingham, Ala.—No improvement has been shown on a wide scale in wire production, but business is holding up well above its recent level of 60 per cent.

Tin Plate

Tin Plate Prices, Page 80

Tin plate specifications are small, consumers showing no inclination to increase their inventories materially, in view of the season. Some substantial releases are looked for before the end of December, however, as sellers attempt to meet anticipated first quarter requirements. Production holds about 35 per cent.

Tin plate is not affected by last week's announcement on first quarter steel prices, previously having been established for delivery through March at $5 a base box, Pittsburgh, Gary or Chicago. While this represented a reduction of $7 a ton from the then-going market, subsequent events indicate the cut will be only $2. This results from the decision of producers to refund domestic customers 25 cents a box, or $5 a ton, on all of the approximately 1,100,000 net tons of tin plate taken between Jan. 1 and Nov. 10. On the latter date the market officially was reduced to $5.

This rebate is the outgrowth of price weakness earlier in the year which at the time was not recognized in the official price.

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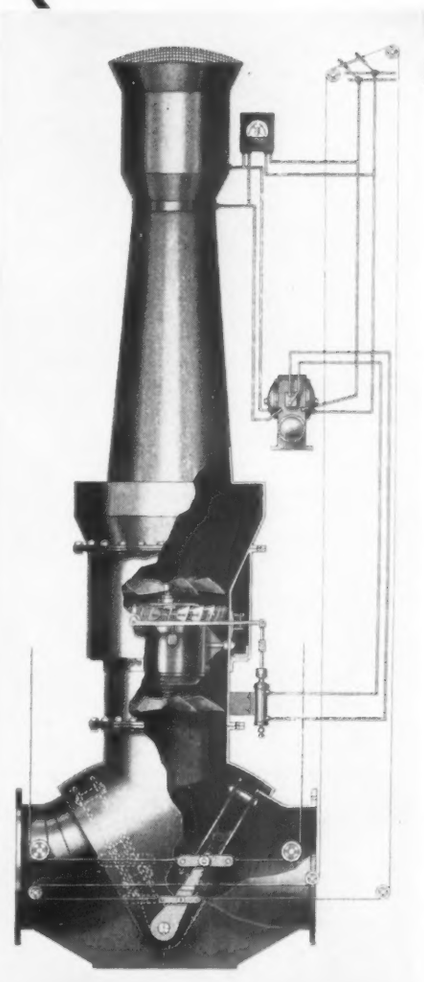

A self-contained unit including Reversing Valve, Blower, Air Measuring Tube, Air Flow Regulator, and Indicating Gauge for Air Flow and Fuel Flow.

The Blower is the Wing air foil type motorized, constant speed, high efficiency Blower, with capacity up to 15,000 cubic feet per minute.

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The reversing valve fits into the automatic reversing system of any regenerative furnace. Reversal of the cocks in the impulse lines for measurement of gas flow is automatically done. For recuperative furnaces, a plain elbow takes the place of the reversing valve. The over-all height of the assembly as shown is approximately seventeen feet. The measuring tube may be horizontal, reducing the height to nine feet.

For gas-tight furnaces, where flue gas is free from contamination by air leakage, the measuring tube is omitted and position regulation of the air dampers is substituted, with an Askania adjustable cam used as the regulating device.

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Rails, Cars

Track Material Prices, Page 81

Buying by railroads is on the increase, both rail and rolling stock contracts being heavier than for several weeks. Bessemer & Lake Erie has placed 100 flat cars and 100 gondolas, Kennecott Copper Co., 12 dump cars and city of Baltimore 40 trolley cars.

The navy department has postponed bids on four flat and four box cars from Dec. 2 to Dec. 9.

Bureau of reclamation, Denver, is considering bids on 3100 tons of rails and 1666 tons of accessories for delivery at Redding, Calif. Norfolk & Western will take bids Dec. 7 on 13,000 tons of rails and Dec. 13 and 15 on 600 box and 1500 hopper cars. Chesapeake & Ohio is preparing to ask bids on 25,000 tons of 130-pound rails for 1939 delivery.

Cars Placed

Bessemer & Lake Erie, 100 flat cars to American Car & Foundry Co., New York; 100 gondolas to a Pennsylvania builder.

City of Baltimore, 40 trolley cars to Pullman-Standard Car Mfg. Co., Chicago.

Kennecott Copper Corp., 12 dump cars to Austin-Western Road Machinery Co., Aurora, Ill.; in addition to 30 placed recently.

Rails Pending

Bureau of reclamation, Denver, 3160 tons 112 and 131-pound rails, 719 tons tie plates, 408 tons railgage plates, 150 tons spikes, 280 tons angle bars, 32 tons track bolts and 97 tons anti-creepers.

Chesapeake & Ohio, 25,000 tons 130-pound rails; bids asked soon.

Norfolk & Western, 13,000 tons; bids Dec. 7.

Buses Booked

American Car & Foundry Motors Co., New York: Six motor coaches for Chicago Railways Co., Chicago; four for Chicago City Railway Co., Chicago; six for Bee Lines Inc., Rockville Center, Long Island, N. Y.

Shapes

Structural Shape Prices, Page 80

New York—American Bridge Co., has been awarded 17,000 tons for superstructure, Meeker avenue bridge, Brooklyn, the largest local contract since September. A good volume of public work is coming out with a sharp upturn expected early next year. School projects are outstanding.

New business booked by the structural steel fabricating industry during October was better than for any month during the past twelve, according to reports received by the American Institute of Steel Construction. It is estimated that the industry during the first ten months of this year booked 922,996 tons whereas in the same period last year 1,396,718 tons were booked. Totals for October were: Bookings, 137,642 tons; shipments, 95,205 tons.

Pittsburgh—Public projects account for practically all of recent structural awards and inquiries. November bookings were about equal to those of October despite some tapering near the end of November. Largest of new inquiries is 3000 tons for an assembly and repair shop at the Alameda, Calif., navy yard.

Cleveland — Structural demand is lagging, particularly from private sources. A fair tonnage is pending for grade crossing eliminations, with 115 tons placed for such work at Blakeslee, O. Fabricated prices continue weak, but the market for plain shapes has been reaffirmed for first quarter.

Chicago—Construction activity is sustained despite fluctuations in fabricated shape demand. Awards are headed by 3880 tons for hangars at McCord Field, Fort Lewis, Wash. Inquiries include 656 tons for three Nebraska bridges, 500 tons for a local subway station and 500 tons for a bridge at Oshkosh, Wis.

Philadelphia—Several fair-sized inquiries are active although one involving 2000 tons for four toll bridges in Cape May county, New Jersey, on which bids are to be opened Dec. 15 is outstanding. Bridge and school work furnish most demand at present. Sellers are extending prices for first quarter.

Buffalo — Numerous structural awards are awaited by fabricators. General contracts for two junior high schools Lockport, N. Y., calling for about 250 tons each, went to De Riso Brothers Inc., New York. A new plant for Hope Window Co., Jamestown, N. Y., 300 tons, is up for bids Dec. 5.

St. Louis—Inquiries have expanded somewhat, and outlook for early next year is promising. Of interest to fabricators 2780 tons for Oklahoma highway bridges, 750 tons for a track elevation in that state and 1200 tons for a viaduct in Kansas City, Mo. Operations at fabricating yards are unchanged at 30 per cent, but are expected to decline somewhat during December.

San Francisco—Award for the Narrows bridge, Tacoma, Wash., involving 15,866 tons, including 3817 tons of cable, 450 tons of H columns and 1071 tons of sheet steel piling, has just been placed with Pacific Bridge Co., San Francisco, General Construction Co., Seattle and Columbia Construction Co., Bonneville, Oreg., at $5,949,730. The sub-contract for the steel went to Bethlehem Steel Co. This is the largest structural letting placed on the Pacific coast this year. Consolidated Steel Corp., Los Angeles, booked 2500 tons for the May department store, Los Angeles. It is estimated that between 6000 and 7000 tons will be required for the machine shops for the Mare Island navy yard, up for bids Dec. 14 and 3000 tons for an assembly and repair shop for the naval air base, Alameda, Calif.

Shape Awards Compared

	Tons
Week ended Dec. 3	**50,888**
Week ended Nov. 26	**18,666**
Week ended Nov. 19	**17,678**
This week, 1937	**8,668**
Weekly average, year, 1937	**13,526**
Weekly average, 1938	**20,861**
Weekly average, October	**17,160**
Total to date, 1937	**1,168,236**
Total to date, 1938	**1,001,309**

Includes awards of 100 tons or more.

Shape Contracts Placed

17,000 tons, superstructure, Meeker avenue bridge, Newton creek, Brooklyn, N. Y., to American Bridge Co., Pittsburgh.

15,866 tons, including 3817 tons of cable, 450 tons of H columns and 1071 tons of sheet piling, Narrows bridge, Tacoma, Wash., to Bethlehem Steel Co., Bethlehem, Pa.

3880 tons, hangars, McCord Field, Fort Lewis, Wash., to Bethlehem Steel Co., Bethlehem, Pa.

2500 tons, May department store, Los Angeles, to Consolidated Steel Corp., Los Angeles.

1000 tons, bearing piles, WPA Lake Shore drive improvement project, Cleveland; bids soon, also includes 1000 tons of concrete bars and 115 tons of sheet piling.

925 tons, public school No. 194, West 144th street, New York, to Harris Structural Steel Co., New York.

875 tons, bridge over Pecos river, Roswell, N. Mex., to American Bridge Co., Pittsburgh.

686 tons, H columns, Santa Ana river bridge near Prado, Calif., to Bethlehem Steel Co., Bethlehem, Pa.

615 tons, hangar, Great Falls, Mont., to Minneapolis Moline Power Implement Co., Minneapolis.

600 tons, state bridges, Port Royal, S. C., to Bethlehem Steel Co., Bethlehem, Pa.

600 tons, fourth unit, junior-senior high school, Wauwatosa, Wis., for board of education, to Worden-Allen Co., Milwaukee.

455 tons, highway bridge FAP-160-E, Harrison county, Mississippi, to Virginia Bridge Co., Roanoke, Va.

368 tons, Washington state, Lewis river bridge, to unstated Portland shop; L. H. Hoffman, Portland, general contractor.

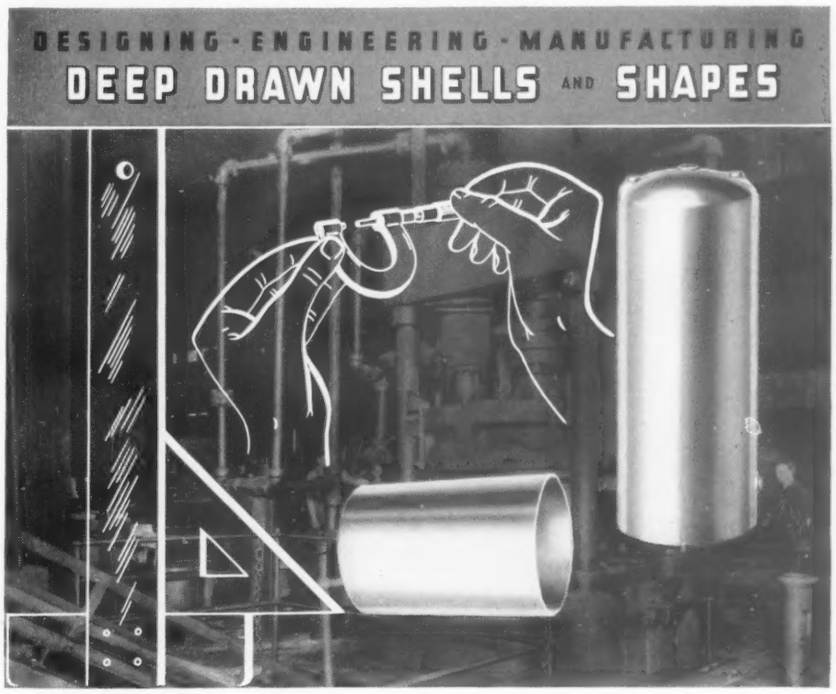
300 tons, state grade separation bridge, Lincoln, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.

300 tons, Marked Tree, Ark., drainage

project to Inland Steel Co. and Bethlehem Steel Co.; through List & Weatherly, Kansas City, Mo.
300 tons, steel anchorages, fish control station, specification 1136-D, Leavenworth, Wash., to unnamed interest.
270 tons, bridge, Caledonia, N. Dak., to Illinois Steel Bridge Co., Jacksonville, Ill.
270 tons, bridge, Nielsville, N. Dak., to American Bridge Co., Pittsburgh.
270 tons, railroad bridge, Alton, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.
240 tons, Crooked Creek dam, Ford City, Pa., to Commercial Shearing & Stamping Co.
230 tons, high school, Garfield Heights, O.; bids Dec. 5.
225 tons, bridge, Lodi, Wis., to Duffin struction Co. and Worden-Allen Co., Iron Works.
210 tons, state bridge FAGS-1-A (1), Sturtevant, Wis., to Bethlehem Steel Co., Bethlehem, Pa.
205 tons, Y. W. C. A. building, Terre-Haute, Ind., to Gage Structural Steel Co., Chicago.
200 tons, New York Central grade elimination, Bogota, N. J., to American Bridge Co., Pittsburgh.
190 tons, bridge FAGH-325G, Monroe county, Wisconsin, to Midland Structural Steel Co., Cicero, Ill.
181 tons, sheet piling for United States bureau public roads, Yorba, Calif., to Bethlehem Steel Co., Bethlehem, Pa.
170 tons, bridge No. 488, Chippewa county, Wisconsin, to Clinton Bridge Works, Clinton, Iowa.
155 tons, high school, Dupont, W. Va., to Ingalls Iron Co., Birmingham, Ala.,
155 tons, Clair Creek county, Colorado, to Midwest Steel & Iron Works Co., Denver.
155 tons, beam spans, FAGH-114-B (2), Sugar City, Idaho, to American Bridge Co., Pittsburgh.
150 tons, state bridge over Ellis river, Bartlett, N. H., to American Bridge Co., Pittsburgh.
150 tons, high school gymnasium, Peru, Ind., for board of education, to New City Iron Works, Chicago.
140 tons, New York Central subway, Seatonville, Ill., to Milwaukee Bridge Co., Milwaukee.
140 tons, high school, Bristol, Tenn., to Bristol Steel & Iron Works, Bristol, Va.
130 tons, bridge, Bartlett, N. H., to American Bridge Co. Pittsburgh.
120 tons Dutch Reformed parish house, Albany, N. Y., to James McKinney & Son, Albany, N. Y.
115 tons, bridge, Lac Qui, Minn., to Illinois Steel Bridge Co., Jacksonville, Ill.
115 tons, state grade elimination, Blakeslee, O., to Bethlehem Steel Co., Bethlehem, Pa.
112 tons, piling, East Ninth street bridge, Cleveland, to Carnegie-Illinois Steel Corp., Pittsburgh; through National Engineering & Contracting Co., Cleveland.
110 tons, Princeton bridge, Maine, to American Bridge Co., Pittsburgh.
110 tons, armory, Indianapolis, to Geiger & Peters, Indianapolis.
100 tons, state spans at Adrian and Terrace Heights, Wash., to Standard Steel Fabricating Co. & Boiler Works Inc., Seattle.
Unstated tonnage, school, Camden, N. J., to Bethlehem Fabricators, Bethlehem, Pa.

Shape Contracts Pending

6000 tons, machine shop, Mare Island navy yard, California; bids Dec. 14.
4089 tons, Lake Washington, Seattle, pontoon bridge; bids in at Olympia, Nov. 29.
3000 tons, assembly and repair shop, naval base, specification 9032, Alameda, Calif.; bids Dec. 21.
2000 tons, four toll bridges, Cape May county, New Jersey; bids Dec. 15; two additional bridges are also up at that time, involving approximately 1000 tons of reinforcing bars.
1780 tons, Waurika, Okla., highway bridge; Brooks & Dalghren, Oklahoma City, Okla., low.
1200 tons, Kansas avenue viaduct, Kansas City, Mo.; List Construction Co., Kansas City, general contractor.
1000 tons, county bridge, Rumson, N. J.; bids Dec. 9.
1000 tons, eight highway bridges, Oklahoma highway commission; bids Dec. 9.
828 tons, crossing near Turlock, Stanislaus county, California, for state; bids opened.
750 tons, Pensacola, Okla., track elevation for St. Louis & San Francisco railway; Leo Sanders, Oklahoma City, Okla., general contractor.
656 tons, three bridges, Benkleman, Nebr.
500 tons, Topeka, Kans., auditorium; F. M. Spencer & Son, Topeka, general contractors.
500 tons, columns and girders for State street subway station, Chicago.
500 tons, bridge, Oshkosh, Wis.
467 tons, three bridges, Pensacola, Fla.
393 tons, Umpqua river bridge, Douglas county, Oregon, general contract to C. J. Montag, Portland, Oreg., and $119,000.
365 tons, alterations to store, for National Clothing Co., Rochester, N. Y.
350 tons, repairs to bridge, Macombs dam, New York.



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Containers for Gases, Liquids and Solids

325 tons, factory building, for Hope's Windows Inc., Jamestown, N. Y.; bids Dec. 5.
325 tons, three state bridges, route 6, New Jersey; bids asked.
305 tons, bridge, Pickens, Miss.
300 tons, Thaddeus Stevens school, for board of education, Pittsburgh.
250 tons, school, Lindenwald, N. J.; bids Dec. 10; also 100 tons of bars required.
250 tons, school, Wilkes Barre, Pa.; bids Dec. 5.
250 tons, beam bridges, Lawrence, Mass., for city.
217 tons, Southern California telephone building, Los Angeles.
215 tons, state bridge over Walker creek, Kanawha, W. Va.
200 tons, Belknap junior high school, Lockport, N. Y.; De Riso Bros. Inc., New York, low, general contract.
175 tons, gun assembly building, navy yard, Washington; bids Dec. 7.
175 tons, undercrossing, Brewster, Wash., for state.
160 tons, state underpass, Okanogan county, Washington; Norris Bros., Burlington, Wash., general contractor.
160 tons, state bridge over Muskegon river, Marion, Mich.
150 tons, shapes, school, Trenton, N. J.; bids Dec. 7.
150 tons, maintenance building, Pennsylvania state highway department, Harrisburg, Pa.; bids Dec. 14.
150 tons, gymnasium, Ft. Francis E. Warren, Wyo., for United States government.
150 tons, Hawley junior high school, Lockport, N. Y.; De Riso Bros. Inc., New York, low.
150 tons, additions, to settling basin, Racine, Wis., for city.
125 tons, school, for board of education, Nassau, N. Y.
125 tons, state bridge FAGM-25-D-2, Wolf Point, Mont.
125 tons, overhead crossing, St. Mary's street, Grafton, W. Va., for state.
110 tons, addition to City of Cleveland power plant; bids in.
108 tons, dam, Mahoning Creek; bids Dec. 17, United States engineer, Pittsburgh; also 85 tons wrought and steel pipe, black and galvanized.
100 tons, bridge, Catron county, New Mexico; bids Dec. 6.
100 tons, school, Dover, Del.; bids Dec. 15.
100 tons, chapel, naval academy, Annapolis, Md.; bids Dec. 21; also 100 tons of bars required.
Unstated tonnage, navy training airship, approximately 1,000,000 cubic feet, not to exceed 325 feet in length; bids secretary of navy, Washington, Feb. 2.
Unstated tonnage, caisson gate for Puget Sound navy yard; bids at Washington, Dec. 21.

Reinforcing

Reinforcing Bar Prices, Page 81

New York—Small awards are well maintained, but few outstanding tonnages are reported. An exception is 2800 tons for ramps for the Meeker avenue bridge, Brooklyn. Close to 1000 tons of mesh for New York state is still pending, part of which will not be bought until next spring. Fabricated prices are still soft.

Pittsburgh—Reinforcing awards last month were heaviest this year. The price situation has also been firmest of the year, and bids which will be opened soon indicate the renewed strength will continue. Some jobs, especially in smaller tonnages, are now experiencing weakness in price, but this is largely localized. The more important jobs are bringing close to list price in most cases.

Cleveland—Concrete bar demand continues slow, with little improvement in private work in early prospect. Inquiry is expected shortly for improvement to Lake Shore drive, Cleveland, taking 1000 tons of bars, 1000 tons of bearing piles and 150 tons of piling. Sandusky, O., will take new bids Dec. 13 on 415 tons of rail steel bars for a filtration plant.

Philadelphia—Approximately 1000 tons of bars for two toll bridges in Cape May county, New Jersey, on which bids opened Dec. 15, is outstanding. Several other inquiries are active including 325 tons for a local school on which Ralph S. Herzog, this city, general contractor, is low. Actual orders are light and are confined principally to lots of 50 tons or less.

St. Louis—A number of projects have come up for bids, but the only award was 200 tons for an Arkansas drainage undertaking to the Laclede Steel Co., St. Louis. Projects pending total approximately 2300 tons, the largest being 1000 tons for a Louisville, Ky., housing program.

San Francisco—Reinforcing bars awards total 4736 tons, bringing the year's aggregate to 143,089 tons, compared with 91,182 tons last year and exceeding by 41,000 tons the total booked in the full year 1937. Among the largest lots placed were 1618 tons for the Narrows bridge, Tacoma, Wash., taken by Bethlehem Steel Co., Bethlehem, Pa., 1000 tons for the May department store, Los Angeles, placed with Consolidated Steel Corp., Los Angeles.

Seattle—Several outstanding contracts are pending including 13,431 tons for the Lake Washington pontoon bridge, Seattle, and 3200 tons for the Bonneville powerhouse superstructure, bids Dec. 9. Plans are under way for the Ballard bridge, Seattle, about 2500 tons, bids soon.

Concrete Bars Compared

	Tons
Week ended Dec. 3	**8,547**
Week ended Nov. 26	**10,371**
Week ended Nov. 19	**5,738**
This week, 1937	**4,635**
Weekly average, year, 1937	**4,056**
Weekly average, 1938	**6,792**
Weekly average, October	**6,990**
Total to date, 1937	**302,775**
Total to date, 1938	**326,014**

Includes awards of 100 tons or more.

Reinforcing Steel Awards

1618 tons, Narrows bridge, Tacoma, Wash., to Bethlehem Steel Co., Seattle.
1200 tons, penitentiary, Terre Haute, Ind., to Laclede Steel Co., St. Louis.
1000 tons, May department store, Los Angeles, to Consolidated Steel Corp., Los Angeles.
861 tons, state office building, Sacramento, Calif., to Soule Steel Co., San Francisco.
575 tons, post office, St. Joseph, Mo., to Sheffield Steel Corp., Kansas City, Mo.; A. Farnell Blair Co., contractor.
450 tons, county building, Decatur, Ill. to Truscon Steel Co., Youngstown, O.; J. L. Simmons Inc., contractor.
433 tons, invitation 516-39-132, army engineers, Huntington, W. Va., to West Virginia Rail Co., Huntington, W. Va.
360 tons, sewage disposal plant, New Castle, Ind., to Inland Steel Co., Chicago; Theodore Bushing, contractor.
280 tons, sewer, Lexington avenue, Rochester, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; F. L. Heughes & Co., contractor.
270 tons, reclamation bureau fish station at Leavenworth, Wash., to unstated interest.
220 tons, bridge 1730, Lawrenceberg, Ind., to Laclede Steel Co., St. Louis; A. G. Ryan & Son, contractor.
200 tons, St. Francis drainage project, Marked Tree, Ark., to Laclede Steel Co., St. Louis; through Weatherly & List, Kansas City, Mo.
200 tons, Washington junior high school, Green Bay, Wis., to Truscon Steel Co., Youngstown, O.; Maurice Schumacher, contractor.
180 tons, Bonneville dam, Tanner creek bypass, to unstated interest; Barham Bros., Salem, Oreg., general contractors.
150 tons, surge basin, Detroit, to Concrete Steel Fireproofing Co., Detroit; Ralph Hidey, contractor.
140 tons, route 6, Lake Villa, Ill., to Truscon Steel Co., Youngstown, O.; Kapschull Construction Co., contractor.
110 tons, high school, El Cerrito, Calif., to W. C. Hauck & Co., San Francisco.
100 tons, Western State Teachers college building, Kalamazoo, Mich., to Calumet Steel Co., Chicago.
100 tons, PWA construction, Lincoln park, Chicago, to Concrete Steel Co., Chicago.
100 tons, hospital, Hillsdale, Mich., to Bethlehem Steel Co., Bethlehem, Pa.

Reinforcing Steel Pending

13,431 tons, Lake Washington, Seattle, pontoon bridge; bids in at Olympia, Nov. 29.
1618 tons, Narrows bridge, Tacoma, Wash.; general contract awarded.
1000 tons, approximately, two toll bridges, Cape May county, New Jersey; bids Dec. 15; 2000 tons of structural shapes required for four additional bridges on which bids are to be taken at that time.
1000 tons, housing project, Louisville, Ky., Rommel & Wittenberg, Louisville, general contractor.
850 tons, billet steel bars, bureau of reclamation, Denver; bids in Nov. 30 prp. A-38215-A.
710 tons, United States Indian irrigation service, Los Angeles, for delivery at Parker, Ariz.; Columbia Steel Co., San Francisco, low.
650 tons, two buildings, submarine base, New London, Conn. Turner Construction Co., Boston, low.
485 tons, wards for Lagunda Honda

home, San Francisco; Munson Bros., San Francisco, low on general contract at $558,644.
475 tons, Arthur Hill high school, Saginaw, Mich.
410 tons, waterworks, Sandusky, O.; rebids Dec. 13.
325 tons, school, Twenty-second street and Norris, Philadelphia, Ralph S. Herzog, that city, low.
300 tons, sewage treatment plant, Anderson, Ind.
300 tons, sewer, Washington.
300 tons, eight highway bridges for Oklahoma highway commission; bids Dec. 9.
250 tons, Fort Thomas, Ky., barracks, Great Lakes Construction Co., Chicago, general contractor.
240 tons, tuberculosis hospital, New Albany, Ind.
208 tons, bridge over Santa Ana river, Riverside county, California, for state; bids Dec. 15.
200 tons, dispensary and barracks, Quantico, Va.; bids Dec. 14.
164 tons, hall of justice, Berkeley, Calif.; Dinwiddie Construction Co., San Francisco, low on general contract at $268,000.
163 tons, baker's school and commissary, Presidio, Calif.; Robt. McKee Co., Los Angeles, low.
150 tons, Hawley junior high school, Lockport, N. Y.; De Riso Bros. Inc., New York city, low.
115 tons, library building, Virginia Military institute, Lexington, Va.
110 tons, school, White Fish Bay, Wis.
100 tons, elevator, Swift & Co., Champaign, Ill.
100 tons, chapel, naval academy, Annapolis, Md.; bids Dec. 21; also 100 tons of shapes required.
100 tons, school, Lindenwald, N. J.; bids Dec. 10; also 250 tons of shapes required.
100 tons, Belknap junior high school, Lockport, N. Y.; De Riso Bros. Inc., New York city; low.
Unstated tonnage, Westlake housing project, Youngstown, O.; Youngstown Builders Syndicate, low.
Unstated tonnage, East Forty-fifth street viaduct, Seattle, $200,000 project; bids Dec. 8.

Pig Iron

Pig Iron Prices, Page 82

Pittsburgh — Pig iron sales are steady. Shipments at old prices are expected to be completed before the end of the year, but new business for delivery after Jan. 1 is being accepted at current quotations. Foundry operations are unchanged, although inquiries indicate likelihood of better business early next year.

Cleveland—November pig iron releases were the highest in 12 months, primarily because of increased activity among nonintegrated steel producers. Foundry melt last month was on a par with October. December outlook indicates little change in demand, although the season will tend to affect shipments adversely. Releases from heating equipment makers has slackened seasonally but is offset by gains among automotive foundries.

Chicago — November pig iron shipments were the heaviest of the year. Sales are small and spotty but have been somewhat better than expected in view of previous coverage. Little change is looked for in December shipments and new business. Prices are steady, with a continuation of present levels into next year indicated.

New York — November showed little change in releases and new orders. Because of the inventory season, December specifications are expected to be confined to early needs. Reaffirmation of present prices for first quarter was anticipated. Export inquiry is spotty, confined mostly to small lots of bessemer and low phos iron.

One large export inquiry is said to involve as much as 150,000 tons, but this has yet to be confirmed as negotiations are reported being carried on through at least one of the large steel companies. Antwerp is mentioned as destination point.

The Troy, N. Y., blast furnace has been blown out, with no date set for resumption of operations.

Philadelphia — Sellers look for a quiet market the remainder of the year. There may be a last minute flurry of specifications, with some

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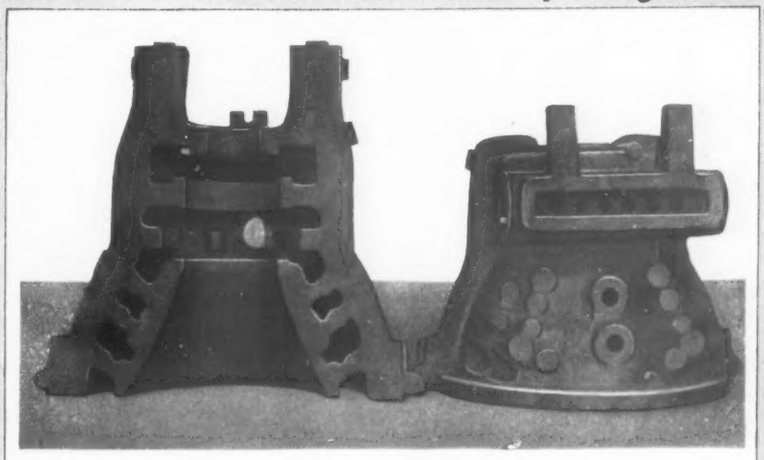

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Behind the Scenes with STEEL

Goodrich Rubber Necks

■ The Goodrich lass continues to get her beautiful self in the news. Out at the Cleveland Trencher Co. some art lover removed her from the October 31 issue of STEEL and posted her in between the two office pencil sharpeners. The results have been astounding, so they tell us. The boys around the office are up there all the time and the company's pencil supply is going fast. Of corsets hard to blame them! (Ouch)

Strip Day . . .

■ December 15 is by way of becoming known as Strip Day down in Pittsburgh. It was on that day in 1935 bond issues were approved for construction of J & L's big new strip mill out on 2nd. Ave. The mill was opened officially on December 15, 1937. Now comes notice that with appropriate fanfare and in the presence of hundreds of interested guests, Carnegie-Illinois will cut the ribbon, throw wide the gates and display the new Irvin Works in all its shining and smokeless glory; this event to take place on none other than December 15! Who's next?

. . . Every Day

■ Which reminds us that the boys around here have been on our neck for some time to give a little attention to the newest and most fascinating continuous strip mill in Cleveland. We won't go into the details of the operations at this time but we do want to say there are some interesting developments worth seeing. The plant is located on E. 9th. St., works five shifts a day and is known to the local gentry as Roxy's Burlesque. Inspection trip will cost you four bits.

Crime Marches On

■ Chicago police have novel methods of making crime pay. Five hundred confiscated slot machines were recently smashed into a neat pile of scrap iron and steel. A large number of stolen, wrecked and unclaimed cars were sold at auction with the stipulation that purchasers could not drive them. And as a third contribution to the local metalworking industry, a supply of revolvers, pistols and miscellaneous ordnance, confiscated from citizens who had too-literally interpreted their constitutional right to bear arms, were melted down and cast into plaques, commemorating various instances of civic heroism.

Shrdlu II

■ We found out last week that we not only have a rival, we have a twin. And of all places, he is out in Peoria, Ill. He calls himself Shrdlu and runs a column in the *Peoria Daily Record*. So far, so good, and we might even feel flattered but what does he do but pick up our "isms" story of November 14 which was told by Eddie Dowling and credit it to a Peoria dentist. A coincidence is what it is. Us Shrdlus are square shooters and we know darned well our cousin from Peoria wouldn't steal our stuff even if it were good.

Treat In Store

■ Short description of STEEL's 1939 Yearbook of Industry issue which you can look for on the morning of January 3). *Usable, Readable, Beautiful, Complete.*

Still The Best

■ And just as we were about to tell you that there are only 18 more shopping days until Christmas, a panting young man from the circulation department rushed in to report that STEEL's renewal percentage once again tops all other weeklies in the field with 80.6 so it looks like most of you will be around a while and we can talk about Christmas, 'n' things, later on.

—SHRDLU

consumers laying in stock placed prior to the $1 advance early in the fall but it is generally believed that there will not be enough of this to offset the holiday and inventory season influences.

Buffalo — November shipments were the best so far this year despite a slower trend late in the month. Inquiry is less active, but foundry operations are fairly well maintained. Consumers have been taking iron only as required, looking forward to no change in first quarter price.

Cincinnati — Automotive demand was responsible for a large part of the 20 per cent increase in November pig iron shipments. Other foundry activity has shown spotty improvement. Late arrival of cold weather has restricted reordering of heating equipment. New pig iron business is limited to fill-in orders.

St. Louis — Pig iron consumption is steady, a decrease at stove plants being offset by a gain at farm equipment plants and at steel mills. While releases have tapered recently, November shipments set a new high mark for the year to date. New business consists of only a few small lots for immediate shipment.

Birmingham, Ala.—Pig iron production continues at its recent rate though producers wonder when the seasonal decline will set in. Sixteen of the district's 18 blast furnaces are in blast.

Toronto, Ont. — Pig iron sales are heavier, exceeding 2000 tons for the week. Inquiries are limited but orders are more numerous as well as larger. The melt is increasing, now averaging slightly better than 60 per cent. Pig iron production is sustained, five active stacks representing 55 per cent of all Canadian capacity. Prices are firm.

Scrap

Scrap Prices, Page 84

Pittsburgh—Scrap prices have an irregular tone here, with weakness more pronounced following a slight show of strength early in the week in small-lot sales. Small tonnages of No. 1 heavy melting steel were sold at both $15.50 and $15. Railroad lists scheduled for closing this week will give a fair idea of price trends to be expected in the immediate future. Despite recent reductions in steelworks scrap consumption only small changes in quotations are in early prospect.

Cleveland—Absence of trading in scrap has brought an easy situation in prices, though quotations are not changed. Heavier grades are in

easier supply and dealers are for most part shipping direct instead of from stocks. December is expected to be quiet until late buying for 1939 delivery is started. Prices here and in the Valley are nominally unchanged.

Chicago — Scrap is weaker here, heavy melting steel being off 50 cents at $14 to $14.50 for No. 1. A number of other grades are correspondingly easier. Lower ingot production and too rapid an increase previously in quotations are given as causes for the lower market. Extension of finished steel prices removes possibility of a bulge in December ingot production, a condition that might have resulted had quotations been advanced.

New York—Purchases are being made by several Japanese firms against an authorized 150,000 tons of heavy melting steel at a reported price of $15.50 for No. 1. Domestic buying is quiet and spotty. The market tone is weaker, although old steel shafting is up 50 cents. Foundry grades are moving slowly, the melt showing little change.

Philadelphia—Sentiment here continues strong, with higher prices noted in No. 1 mixed yard cast. This grade now is $14.50 to $15, up 50 cents. Heavy melting steel for domestic account is nominally unchanged, although export prices are stronger at $14.50 and $13.50, Port Richmond, for No. 1 and No. 2. Export demand is strengthening the domestic market for heavy melting, although no actual advances have been made.

Buffalo—Scrap prices are unchanged, but the market has an easier tone. Some consumers have pared bidding prices, but dealers refuse to sell below prevailing ranges. Most mills are out of the market, although relatively heavy ingot production is expected to necessitate new scrap buying before long. Dealers have rather moderate yard supplies.

Detroit—Prices are unchanged, with buying generally light and no large lists up for bids. Some strength is apparent in bundles, but it will probably be another week before this is reflected in the present price of $11.75 to $12.25.

Cincinnati—Sentiment continues bullish, and with better activity in nearby districts, dealers have advanced prices on a number of grades, including heavy melting steel, 25 cents. Sufficient scrap is available to meet mill requirements, a large part being from yard stocks. Blast furnace grades lag behind heavy melting and specialties.

St. Louis—Heavy shipments by railroads and other sources have resulted in an easier tone in scrap. Heavy melting steel is down 25 cents. In the absence of sales other grades nominally are unchanged, but it is doubtful if steel specialties would bring prices quoted in dealers' lists.

Birmingham, Ala. — Some improvement has been noted in demand for scrap but business on the whole continues dull.

Seattle—The market is slightly firmer, Japan's purchases being the controlling factor. No. 1 heavy melting steel is scarce at tidewater and quotations are stronger at $12 to $13. Ocean freights for full cargoes of scrap also have firmed to about $3.90, free in and out. Conference rates on liners remain $5.50 to $51.

Toronto, Ont.—Scrap prices are strong here, dealers offering the top figure of the spread in quotations on some grades. Heavy melting steel is in demand at $10 to $11, with a higher price paid in certain instances. Machinery cast also is in good demand, while the call for stove plate is irregular. Other grades are slow.

Warehouse

Warehouse Prices, Page 83

Cleveland—December offers little possibility of a pickup in business, seasonal factors being expected to continue the downward trend of late November. Prices are steady.

Boston—Based on the new quantity differential plan for hot-rolled products involving 40,000-pound orders instead of 10,000-pound mixed purchases, warehouse prices in this district have been reduced considerably. Prices are minimum for the 40,000-pound purchases with extras for smaller lots. Galvanized sheets are marked up $5 a ton to 4.76c for No. 24 gage.

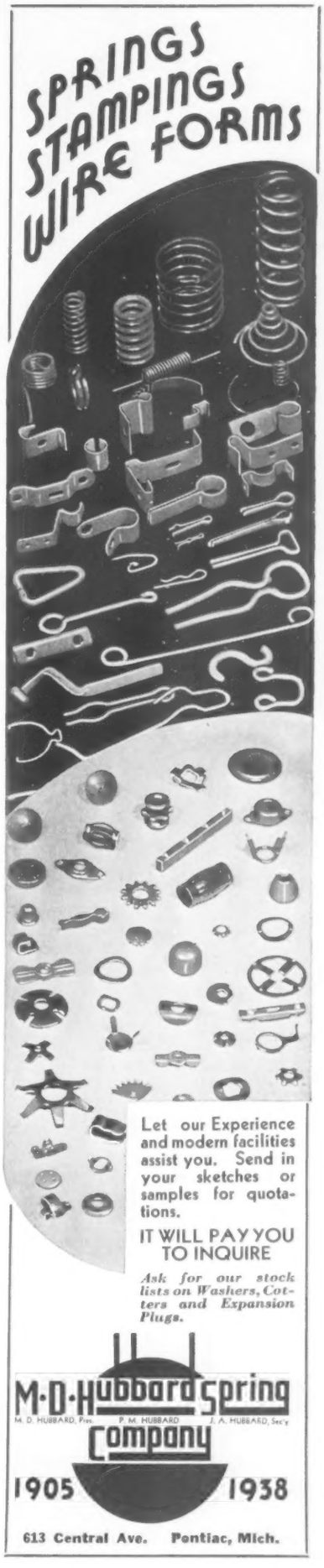
Philadelphia—A seasonal letdown in sales is anticipated this month, following a slight gain in November. Prices are fairly steady.

Buffalo—November sales were at about the same daily rate as in October, although the total was off slightly.

Cincinnati—Warehouse sales have lacked the usual seasonal tapering, aided by heavier orders for plates and shapes. Prices are steady.

St. Louis—Sales have declined the past week or ten days, but November business compared favorably with the corresponding 1937 month. Building materials are slow, but railroads are taking fair size lots and oil industry needs are active.

Seattle—Business is spotty, with no improvement expected before January. PWA work has failed to stimulate demand. Little competi-



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AT THE HEART

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HOTEL CLEVELAND *Cleveland*

tion is being offered by small lots of foreign steel received here.

Steel in Europe

Foreign Steel Prices, Page 83

London—(*By Radio*)—Some market activity is appearing in Great Britain, owing to consumers placing orders for year-end supplies. Production of steel and iron are expanding slightly and further business revival is expected when price policy for next year is announced. Most surplus stock of pig iron and semi-finished steel has been absorbed by transforming works and operations are unequally distributed.

The Continent reports quiet conditions but the outlook is fairly good. Prices are being well maintained.

Iron Ore

Iron Ore Prices, Page 84

New York — Some revision in imported ore prices are noted here, with reductions in several iron ores and in tungsten and a slight firming up in some grades of manganese ore. Little tonnage is being figured, with most consumers still drawing on stocks under contract.

Manganiferous ore, 45-55 per cent iron and 6-10 per cent manganese, is 12 cents, alongside docks Atlantic ports, and reductions of one cent have brought North African low phosphorus ore and Swedish low phosphorus ore down to this level. Swedish basic, on the other hand, is being quoted nominally higher at 11 cents.

Chinese wolframite is down nominally $1 per short ton unit to $20, duty paid. Imported scheelite is also off $1, to $21.

While some high grades had been holding nominally at 30 to 32 cents per unit, without duty, there seems to be a disposition by manganese ore importers to stiffen offering prices to around 32 cents on both Caucasian and South African, 50-52 per cent. Indian manganese ore, 49-51 per cent, is now being offered at 30 to 32 cents; Brazilian, 46-48 per cent, at 29 cents; and Chilean, 46-48 per cent, at 29 cents.

Eastern local foundry and basic ores, 56-63 per cent, are holding nominally at 9¼ cents per unit, delivered eastern Pennsylvania.

Cleveland — Shipment of iron ore from upper lake ports during the 1938 season totaled 19,263,011 tons, according to the Lake Superior Iron Ore association. This represents a decrease of 43,335,825 tons or 69.2 per cent from the 62,598,836 tons shipped in 1937. The closest comparable movement of iron ore in recent years was in 1933 when 21,623,898 tons were brought down.

November shipment aggregated 1,481,305 tons, compared with 1,424,679 tons in the same month last year, but represents a substantial decline from the 3,624,416 tons shipped during October of this year.

Shipments for the 1938 and 1937 season as tabulated by the Lake Superior Iron Ore association, follow:

Port	1938	1937
Escanaba	1,077,809	3,147,977
Marquette	1,333,038	5,101,700
Ashland	2,274,601	5,651,879
Superior	6,823,488	22,222,116
Duluth	3,920,961	16,731,688
Two Harbors	3,833,114	9,743,476
Total	19,263,011	62,598,836

Comparisons of total Lake Superior ore shipments over the past ten years follow:

Season		Season	
1938	19,263,011	1933	21,623,898
1937	62,598,836	1932	3,567,985
1936	44,822,023	1931	23,467,786
1935	28,362,368	1930	46,582,982
1934	22,249,600	1929	65,204,600

Baltimore—Eight shipments of iron ore were received here from abroad in the period Nov. 9 to Nov. 21, inclusive. These arrivals were 21,200 tons from Cruz Grande, Chile, Nov. 9; 21,700 tons, Cruz Grande, Nov. 11; 6850 tons, Rio de Janeiro, Nov. 12; 11,500 tons, Cruz Grande, Nov. 15; 21,500 tons, Cruz Grande, Nov. 18; 10,500 tons, Daiquiri, Cuba, Nov. 19; 7202 tons, Narvbik, Sweden, Nov. 21; and 21,300 tons, Cruz Grande, Nov. 21.

Other ore arrivals during that period included 8700 tons of manganese ore from Takorabi, Gold Coast, West Africa, Nov. 11; 8100 tons of manganese ore from Poti, Russia, Nov. 12; 1000 tons of chrome ore from Thessaloniki, Greece, Nov. 16; and 1000 tons of fluorspar, Marseille, Nov. 17.

A shipment of 950 tons and 165 barrels of ferromanganese came in from Sauba, Norway, Nov. 20.

Coke Oven By-Products

Coke By-Product Prices, Page 81

New York—Current production of distillates is moving steadily to consuming channels at unchanged prices. Toluol demand for lacquer-making is well maintained and in spots there is a short supply of benzol. Phenol is slightly less active, while naphthalene is slow between seasons. Consumers of phenol are keeping inventories low. Sulphate of ammonia will advance 25 cents a ton Dec. 1 and to $28 a ton on Jan. 1, this price to apply in January-June business next year. Current shipments against contracts are steady.

Nonferrous Metals

New York—Price weakness which continued last week in metal markets due to unfavorable developments on the Continent has not shaken confidence of traders in the domestic outlook. Consumers, however, restricted new purchases pending establishment of more stable conditions and passage through the year end inventory period.

Copper—Export slumped early in the week to a low of 10.25c, firmed and then closed at the low, c.i.f. European ports. Offerings of resale electrolytic were made here as low as 10.25c, Connecticut, and were available at the weekend at 10.37½c. November sales in the domestic market were the lowest in over four years at only 12,524 tons but producers' prices held unchanged at 11.25c, Connecticut.

Lead—Buyers abstained from buying more than occasional carlots but heavier sales are expected since about 16,000 tons must be bought for December needs and practically all of the metal for January requirements. Prices declined $2 per ton on Tuesday to the basis of 4.85c, East St. Louis.

Zinc—Due to the $7 per ton reduction in the tariff, effective Jan. 1, slab zinc prices eased $2 per ton further on Tuesday when the domestic market again became vulnerable to imports. Prime western was quoted at 5.50c, East St. Louis, Frequent fluctuations are expected in line with changes in London.

Tin—Offerings of resale metal generally set the price pace here with importers' limits well above the going market. Consumers continued to display only light buying interest with Straits spot closing at 45.85c.

Antimony—This market continued dull with prices unchanged at 12.25c, New York, for American spot in cases and nominally 14.00c, duty paid New York, for Chinese spot.

Ferroalloys

Ferroalloy Prices, Page 82

New York—Some decrease in ferromanganese shipment is thought not unlikely during December, fol-

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound

Nov.	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
26	11.25	11.37½	10.77½	45.75	45.85	5.10	4.95	4.75	20.00	12.25	35.00
28	11.25	11.37½	10.77½	45.65	45.75	5.10	4.95	4.75	20.00	12.25	35.00
29	11.25	11.37½	10.77½	45.85	45.95	5.00	4.85	4.50	20.00	12.25	35.00
30	11.25	11.37½	10.77½	46.25	46.35	5.00	4.85	4.50	20.00	12.25	35.00
Dec.											
1	11.25	11.37½	10.77½	46.15	46.30	5.00	4.85	4.50	20.00	12.25	35.00
2	11.25	11.37½	10.77½	45.85	46.00	5.00	4.85	4.50	20.00	12.25	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 11.25c Conn. copper

Sheets

Yellow brass (high)	17.50
Copper, hot rolled	19.37½
Lead, cut to jobbers	8.25
Zinc, 100 lb. base	9.75

Tubes

High, yellow brass	20.25
Seamless copper	19.87½

Rods

High yellow brass	13.37½
Copper, hot rolled	15.87½

Anodes

Copper, untrimmed	16.62½

Wire

Yellow brass (high)	17.75

OLD METALS

Nom. Del. buying prices

No. 1 Composition Red Brass

New York	6.55-6.65
Cleveland	6.75-7.00
Chicago	5.37½-5.87½
St. Louis	6.25-6.50

Heavy Copper and Wire

New York, No. 1	7.75-8.00
Cleveland, No. 1	7.75-8.00
Chicago, No. 1	7.50-7.75
St. Louis	8.25-8.50

Composition Brass Borings

New York	5.65-5.85

Light Copper

New York	6.25-6.50
Cleveland	6.00-6.25
Chicago	5.37½-5.87½
St. Louis	6.25-6.50

Light Brass

Cleveland	3.25-3.50
Chicago	3.50-3.75
St. Louis	4.25-4.50

Lead

New York	3.75-4.00
Cleveland	4.00-4.25
Chicago	4.00-4.12½
St. Louis	4.00-4.25

Zinc

New York	2.50-2.62½
Cleveland	2.50-2.75
St. Louis	2.50-2.75

Aluminum

Borings, Cleveland	5.75-6.00
Mixed, cast, Cleveland	7.75-8.00
Clips, soft, Cleveland	13.25-13.50
Mixed cast, St. Louis	8.00-8.50

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads	11.00
Standard No. 12 aluminum	14.00-14.50

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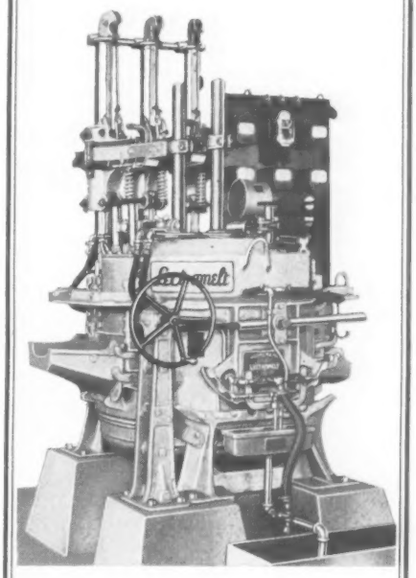

Illustration shows new 500 pound capacity 3 phase direct arc LECTROMELT furnace installed in jobbing steel foundry.

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CORP.

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lowing the November rise to the year's best level. A continuation of the current market of $92.50, duty paid, into first quarter would be expected to cause demand to follow closely the trend in ingot production. A similar situation prevails in spiegeleisen, with current prices of this material and other ferroalloys unchanged.

Imports Are Light

Philadelphia — A shipment of 100 tons of ferromanganese from Norway was received here in the week ended Nov. 26. Other arrivals included 63 tons of structural shapes from Belgium; and 38 tons of steel forgings and four tons of steel tubes, both from Sweden.

Soviet To Preserve Exhibit

■ Russia's exhibit at the New York world's fair is being built so that it can be disassembled and shipped in sections to the Soviet Union where it will be re-erected as a permanent memento. More than 1200 tons of structural steel will go into its 170-foot pylon and 70,000-square-foot air conditioned pavilion, equipped with elevators and escalators.

The special construction necessitates use of bolts rather than riveting or welding, dry-fastening of gypsum and asbestos panels, and greater structural strength and weight than is required in other exhibit buildings.

Trade Pacts Are Analyzed

■ THOROUGH study of the new trade agreements between the United States and Canada, and the United Kingdom and the United States has been made by United States chamber of commerce officials. Discussing significant developments, chamber officials said:

"First, that the far-reaching economic changes embodied in the agreements are being measured against the wide political significance of these pacts, and acceptance of reduced tariff protection and narrowed Empire preferences has been influenced in all three countries by world political considerations;

"Second, that not only are the two agreements interlinked as between the three countries concerned, but also there is such close tie-up with many other parts of the British Empire, that the agreements constitute in effect a multilateral trade pact;

"Third, that certain statutory provisions of our own customs and excise laws prevented wider application of the agreement which the negotiators apparently desired, and which seems to forecast subsequent efforts to have changes by congress enacted;

"Fourth, that the present substantial breach accomplished—at a price—in the restricted character of the Empire preferential setup established at Ottawa may be further expanded in subsequent negotiations with other Empire components;

"Fifth, that, as one analyzes the two agreements, it is quite apparent that effort has been made to balance the disadvantages created by concessions in one agreement by advantages accorded by the other agreement."

Of the most-favored-nation-treatment, it was said: "As in previous trade agreements there is agreement to accord unconditional most-favored-nation treatment as to rates of duty, prohibitions and restrictions, quotas, and foreign purchases by government monopolies. Both governments agree to give each other advance notice of the contemplated imposition of antidumping duties and duties to countervail bounties and subsidies. Should a third country get the major benefit from any concession to an extent that threatens serious injury to producers in the importing country, there may be withdrawal or modification of such concession, after notice and consultation.

"In case of wide variation in rates of exchange there may be negotiations for changing the agreement, and if these fail, its termination. Both agreements remain in force for three years, subject to indefinite continuation thereafter, until six months after notice of termination by either country."

Bolt, Nut, Rivet Makers Report Industry Growth

■ Bolt, nut, washer and rivet manufacturers, other than departments of rolling mills, reported gains in employes, wages and value of products in returns to the 1937 census of manufactures. Employes increased 34.7 per cent, from 12,506 in 1935 to 16,840 in 1937; wages 65.1 per cent, from $13,375,326 to $22,088,126; value of products 70.8 per cent, $57,420,029 to $98,079,243.

Copper, Lead Smelters Show Steady Increase

■ Smelters and refiners of copper and lead reported increased employment, wages and value of products in 1937, compared with 1935, in returns to the census of manufactures.

Wage earners in the copper industry increased 38.9 per cent from 10,449 in 1935 to 14,514 in 1937; wages 87.7 per cent, from $11,154,196 to $20,941,462; value of products 105.4 per cent, from $348,257,026 to $715,354,577. Compared with the 1933 census employment increased 159.4 per cent, wages 288.8 per cent and value of products 351 per cent.

In the lead industry employment

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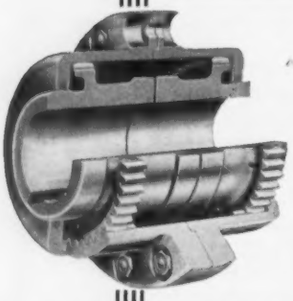

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Baltimore, Md.

rose 26.6 per cent, from 3187 in 1935 to 4036 in 1937; wages 62 per cent, from $3,423,931 to $5,546,558; value of products 84.8 per cent, from $137,219,290 to $253,597,853. Compared with 1933 these increases were 91.7 per cent, 138.6 per cent and 260 per cent, respectively.

Equipment

Cleveland—November was the best month this year for most machine tool and equipment dealers, increases over October ranging between 15 and 30 per cent. Several sizable orders were placed during the month, National Machinery Co., Tiffin, O., taking a number of horizontal boring machines, lathes, grinders and other tools. Inquiries are fairly active and quotations have been furnished on a large volume, some of which may not be released until next spring.

Monarch Machine Tool Co., Sydney, O., is low on six toolmakers' precision lathes for the navy, Washington yard, at $32,562.

Seattle — Industrial buying is small and public works projects create most demand. Puget Sound navy yard opened bids Dec. 1 for four high-pressure air reducing valves and Dec. 6 for five steel billets weighing 30½ tons. Seattle has called bids Dec. 5 for furnishing 100 street car wheels. Port of Grays Harbor, Hoquiam, Wash., will open tenders Dec. 7 for 12 dock trailers. Subject to Indian service approval, Worthington Pump Co., Harrison, N. J., has been awarded three pumping units for the $700,000 Flathead, Mont., irrigation project. G. L. Sperry, engineer, states bids are yet to be called for three 3000-horsepower motors, four 2500-kva transformers and three 48-inch welded steel pipe lines, 630 feet long.

Three large water turbines for installation in the Coulee powerhouse will be constructed by Newport News Shipbuilding & Drydock Co., Newport News, Va., low bidder at $1,477,200. These turbines will develop 150,000 horsepower. Reclamation bureau also awarded at $67,854 the contract to supply actuator-type governors for the same project to Woodward Governor Co., Rockford, Ill.

Chicago — Machine tool interests generally found November a poor month. December prospects are better. Inquiries have improved both in tone and in volume the past week, although bookings remain slow and unchanged, it is reported. Buyers indicate demands are for immediate needs.

Cites Factors in Economic Security

(*Concluded from Page 24*)

cially minded employers to provide added protection adjusted to varying family needs, desires and standards of living."

Mr. Stettinius was unable to deliver his address in person because of serious illness in his family. It was read by William Beye, vice president of the Steel corporation.

Three essential factors in economic security, Mr. Stettinius stated, are the individual, the state and the business group made up of employe and employer.

"Industry as well as the individual and state has a definite duty in meeting that demand."

Group insurance he commended to employers as a means of bolstering social insurance and the individual's private insurance.

■ American railroads in first nine months of 1938 hauled an average of 8.8 tons of freight and equipment one mile for each pound of coal consumed in freight service, a new high in fuel efficiency. For the same period in 1937 the average was 8.7 tons, the Association of American Railroads reports.

October Exports, Imports in Detail

■ SUPPLEMENTING general statistics of steel and iron foreign trade in October, by metals and minerals

FOREIGN TRADE OF UNITED STATES IN IRON AND STEEL

Gross Tons

	1938		1937	
	Exports	**Imports**	**Exports**	**Imports**
Jan.	586,294	29,631	201,692	43,063
Feb.	460,640	19,589	290,987	40,728
March	526,883	11,827	570,584	51,805
April	489,202	21,237	683,674	68,197
May	540,639	20,814	969,222	49,050
June	312,021	15,887	826,534	44,771
July	263,699	14.728	889,438	47,012
Aug.	242,139	20,041	836,319	61,489
Sept.	346,068	27,958	543,740	37.071
Oct.	425,431	26,445	522,611	37,186
10 mo.	4,193,016	208,157	6,384,848	480,372
Nov.	.....	.....	556,691	26,996
Dec.	.....	.....	626,418	25,792
Total	.....	.....	7,567,884	553,160

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division, department of commerce, presented in STEEL, Nov. 28, page 19, the following tables, not available at that time, give further details.

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS
Gross Tons

Articles	Oct., 1938	Sept., 1938	Jan. thru Oct., '38
Pig iron	61,339	66,600	373,846
Ferromanganese and spiegeleisen	6	1	233
Other ferroalloys	70	129	1,000
Ingots, blooms, etc.:			
Not containing alloy	5,980	3,916	146,632
Alloy incl. stainless	1	2,054	7,215
*Steel bars, cold fin.	335	328	11,551
Bars, iron	152	180	1,275
Bars, concrete	2,962	1,610	17,908
Other steel bars:			
Not containing alloy	8,196	6,712	90,086
Stainless steel	4	265	547
Alloy, not stainless	224	887	3,917
*Welding rods, electric	131	67	929
Wire rods	1,232	508	20,376
Boiler plate	328	788	6,289
Other plates, not fab.:			
Not containing alloy	18,316	7,329	151,124
Stainless steel	9	100	252
Alloy, not stainless	175	24	2,192
Skelp iron or steel	13,817	3,469	27,541
Sheets, galv. iron	74	315	3,067
Sheets, galv. steel	7,148	6,141	59,080
Sheets, "black" steel:			
Not containing alloy	13,830	16,362	154,801
Stainless steel	99	42	1,561
Alloy, not stainless	498	206	3,180
Sheets, black iron	632	676	6,289
Strip steel, cold-rolled:			
Not containing alloy	1,588	2,228	20,312
Stainless steel	30	39	359
Alloy, not stainless	5	102	278
Strip steel, hot-rolled:			
Not containing alloy	4,464	3,228	28,723
Stainless steel	4	20	128
Alloy, not stainless	30	2	77
Tin plate, taggers' tin	12,330	12,061	135,583
Terne plate	214	246	3,749
Tanks, except lined	3,217	5,341	33,681
Shapes, not fabricated	5,944	5,131	70,568
Shapes, fabricated	4,324	3,144	31,584
Plates, fabricated	915	2,511	21,581
Metal lath	28	81	722
Frames and sashes	99	55	1,130
Sheet piling	276	37	2,864
Rails, 60 lbs.	6,057	1,139	41,032
Rails, under 60 lbs.	90	82	4,169
Rails, relaying	17	12,596	28,074
Rail fastenings	264	1,207	6,379
Switches, frogs	183	151	1,508
Railroad spikes	171	142	2,168
R. R. bolts, nuts, etc.	198	81	938
Boiler tubes, seamless	580	691	10,012
Boiler tubes, welded	22	45	1,417
Pipe:			
S'ml's cas'g, oil-line	3,004	2,539	41,803
Do. welded	248	293	9,789
Seamless black, except casing	728	523	6,157
Pipe fittings:			
Mall. iron screwed	280	239	2,606
Cast-iron screwed	191	93	1,598
Pipe and fittings for:			
Cast-iron pressure	694	2,303	16,281
Cast-iron soil	709	905	8,133
Pipe, welded:			
Black steel	1,175	796	8,912
Black wrought-iron	194	689	2,695
Galvanized steel	1,360	1,620	10,955
Galv. wrought-iron	102	85	1,821
Pipe and fittings:			
Riveted iron or steel	3	7	940
Wire:			
Plain iron or steel	2,618	2,934	19,776
Galvanized	2,506	2,139	19,599
Barbed	4,092	4,767	27,066
Woven wire fencing	325	156	1,810
Woven wire screen cloth:			
Insect	39	14	215
Other	85	82	897
Wire rope and cable	235	218	2,967
Wire strand	32	98	703
Card clothing	13	8	71
Other wire	428	460	4,623
Wire nails	2,040	1,974	15,999
Horseshoe nails	93	32	742
Tacks	36	47	218
Other nails, staples	351	414	3,440
Bolts, machine screws	674	625	6,643
Castings:			
Gray iron, semi-steel	305	448	3,109
Malleable-iron	65	34	1,019
Steel, not alloy	78	177	1,155
Alloy incl. stainless	60	43	675
Car wheels, tires, axles	1,235	1,347	18,468
Horseshoes and calks	39	3	98
Forgings, n.e.s.:			
Not containing alloy	382	1,162	6,956
Alloy incl. stainless	450	52	758
Total (gross tons)	201,477	196,395	1,786,624
Scrap, iron and steel	221,466	147,203	2,386,323
Scrap, tin plate	1,539	1,578	10,283
Tin plate circles, strips, cobbles, etc.	104	284	3,649
Waste-waste tin plate	845	608	6,137
Total scrap	223,954	149,673	2,406,392
GRAND TOTAL	425,431	346,068	4,193,016
Iron ore (gross tons)	98,466	96,628	528,460

*No distinction prior to 1938.

UNITED STATES IMPORTS OF IRON AND STEEL PRODUCTS
Gross Tons

Articles	Oct., 1938	Sept., 1938	Jan. thru Oct., '38
Pig iron	1,174	6,922	30,358
Sponge iron	18	31	380
Ferromanganese*	2,281	3,887	14,221
Spiegeleisen	2,720	1,069	9,771
Ferrochrome†	.....	1	100
Ferrosilicon‡	61	180	610
Other ferroalloys§	.....	.....	1
Steel ingots, blooms	32	158	197
Billets	21	19	491
Concrete reinforc. bars	86	105	1,101
Hollow bar, drill steel	79	72	683
Bars, solid or hollow	1,261	1,125	15,314
Iron slabs	.....	.....	.....
Iron bars	5	7	452
Wire rods	415	564	3,997
Boiler and other plate	8	24	303
Sh'ts, skelp, saw plate	61	189	5,829
Die blocks or blanks	3	1	71
Tin plate, taggers' tin and terneplate	8	4	91
Structural shapes	3,279	1,902	31,970
Sashes and frames	.....	.....	.....
Sheet piling	235	.....	235
Rails and fastenings	157	669	3,041
Cast-iron pipe, fittings	104	50	1,225
Malleable iron pipe fittings	9	11	76
Welded pipe	822	183	4,927
Other pipe	2,421	2,156	19,785
Cotton ties	1,867	868	8,692
Other hoops, bands	1,079	922	13,638
Barbed wire	973	671	11,230
Round iron, steel wire	199	167	1,168
Telegraph, 'phone wire	2	1	9
Flat wire, steel strips	243	180	2,095
Wire rope and strand	162	214	1,750
Other wire	114	49	1,178
Nails, tacks, staples	414	739	6,081
Bolts, nuts, rivets	30	62	186
Horse and mule shoes	40	39	379
Castings and forgings	538	499	3,339
Total (gross tons)	20,921	23,740	194,974
Iron and steel scrap	5,524	4,218	13,183
GRAND TOTAL	26,445	27,958	208,157

*Manganese content; †chrome content; ‡silicon content; §alloy content.

ORIGIN OF OCTOBER IMPORTS
Gross Tons

	Iron ore	Pig iron	Manganese ore	Ferromanganese
Norway	25,116	.....	.....	1,297
Sweden	14,546	30	.....	.....
United Kingdom	60	.....	.....	.....
Algeria	7,480	.....	.....	.....
Cuba	21,000	.....	3,122	.....
Chile	155,200	.....	.....	.....
Australia	3,000	.....	.....	.....
Netherlands	.....	203	.....	161
Canada	.....	335	.....	.....
British India	.....	606	3,367	.....
Soviet Russia	.....	.....	4,914	.....
Gold Coast	.....	.....	3,924	.....
France	.....	.....	.....	151
Czechoslovakia	.....	.....	.....	672
Total	226,402	1,174	15,327	2,281

	Sheets, skelp and sawplate	Structural steel	Steel bars	Hoops and bands
United Kingdom	10	.....	11	.....
Belgium	46	2,541	646	599
France	1	689	379	394
Sweden	2	.....	199	3
Canada	2	.....	3	.....
Germany	.....	49	23	83
Total	61	3,279	1,261	1,079

Foundry Course Planned

■ Chicago Chapter, American Foundrymen's association, has announced its program for the 1939 foundry lecture course, for operating foundrymen, apprentices and students, beginning Jan. 16. Lectures are scheduled for those Monday evenings when there are no regular chapter meetings.

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Construction and Enterprise

Ohio

ASHLEY, O.—Village, R. A. Whipple, mayor, is taking new bids due Dec. 16 on construction of iron removal plant and water softener and hydrant installations costing total of $17,500. Consulting engineers, Hoover & Montgomery, Columbus, O.

BRYAN, O.—Village, Charles Hester, clerk, is preparing plans and will probably call for bids soon on final contracts for construction of chemical-process sludge-type sewage disposal plant costing $145,000. Consulting engineers, Champe, Finkbeiner & Associates, Toledo, O. (Noted Sept. 19.)

CINCINNATI — Cincinnati Milling Machine Co. is planning to build a 400,000-square foot addition for melting purposes to its foundry. Will be erected in 100,000-square foot units. Carlton E. Brown, plant engineer.

COLUMBIANA, O.—Village, P. J. Mullen, clerk, is taking bids due at noon, Dec. 9, for construction of a water softening plant to cost $10,000. Certified check or bond 5 per cent to accompany bid. Consultants, Hoover & Montgomery, Columbus, O.

EAST PALESTINE, O.—City, Lee Wile, clerk, receives bids due noon, Dec. 9, on first contract of water and light plant improvements. Program includes building remodeling and installation of 1500-kilowatt turbine generator and condenser unit. F. S. Barckhoff Sr., Salem, O., consulting engineer.

MANSFIELD, O. — Mansfield Tire & Rubber Co. is contemplating the construction of a two-story factory building costing about $100,000 complete with machinery.

MONROEVILLE, O. — Village, C. H. Zippel, mayor, will hold referendum soon in regard to construction of proposed municipal light plant costing $78,180. Includes three diesel engines and a 5-ton crane. PWA grant approved and owner's share available. William C. Kammerer & Associates, Cleveland, consulting engineers. (Noted Oct. 31.)

MT. GILEAD, O. — Village, J. P. Bennett, mayor, is contemplating construction of a sewage disposal plant to cost about $40,000. Consulting engineer, Floyd G. Browne, Marion, O.

NORTH BALTIMORE, O. — Village, Fred Halboth, mayor, is taking bids due at noon, Dec. 9, on construction of a municipal light and power system costing $194,671. Includes two 450-horsepower and one 375-horsepower diesel engine. Carl Simon, Van Wert, O., consulting engineer.

POWHATAN POINT, O. — Village, John Goodhue, mayor, will probably readvertise for bids about Dec. 5 on sections B and C in a waterworks construction program costing $82,432. Sections involve steel storage tank, water softener and pump house. Consulting engineer in project, Carl Simon, Van Wert, O. (Noted Oct. 12.)

SALEM, O.—City, Frank Wilson, service director, is taking bids due at noon, Dec. 8, on waterworks improvements, including boiler equipment modernization, new stack and pipe lines. F. S. Barckhoff Sr., city engineer. Certified check or bond 5 per cent to accompany bid. (Noted Nov. 14.)

SANDUSKY, O.—City, R. J. Wagar, manager, has rejected bids and made new plans and specifications on Divisions A and B of construction of proposed waterworks costing $820,000. Taking new bids due Dec. 13. Project involves pumping station, purification plant, filter units, motor-driven pumping units, reception basins, sedimentation basins and storage basin. Greeley & Hanson, Chicago, consulting engineers. (Noted Nov. 7.)

TROY, O. — City, J. D. Boak, mayor, takes bids due at noon, Dec. 8, in construction of a sewage disposal plant and sewers costing about $143,000. Plans provide for primary treatment plant, settling tank, pumping equipment and sludge filtration. Certified check or bond 5 per cent to accompany bids. George B. Gascoigne & Associates, Cleveland, engineers.

Connecticut

DARIEN, CONN. — Town, J. B. Corbin, town hall, representative, is taking bids until Dec. 15 on construction of a sewage treatment plant to cost approximately $562,250. Sanborn & Bogert, New York, engineers. (Noted Oct. 31.)

NORWICH, CONN. — City, electric light department, is making plans for improvements and extensions in its power plant at cost of $753,770. PWA has approved $339,197 grant in work.

Massachusetts

BELLINGHAM, MASS. — Town is now receiving bids on contract No. 1 for a $519,560 water project, which includes wells, pipe lines, meters, hydrants and pumping station. Hayden, Harding & Buchanan, Boston, consulting engineers. (Noted Oct. 24.)

QUINCY, MASS. — Procter & Gamble Co., Cincinnati, has acquired a ten-acre tract on which it plans to erect a manufacturing unit costing upwards of $1,000,000.

New York

BINGHAMTON, N. Y. — City is taking bids for an unstated time on first contract of $550,000 municipal waterworks project. Barker & Wheeler, Albany, N. Y., engineers.

JAMESTOWN, N. Y. — Clark Hardware Co., 13 East Third street, will take bids soon on general contract for erecting two-story 100 x 100-foot warehouse estimated to cost $40,000. Beck & Tinkham, Bailey building, engineers.

NEW YORK — Philip Ruxton Inc. is having plans prepared for a seven-story laboratory building estimated to cost about $175,000. E. L. Kear, 545 Fifth avenue, architect and engineer in the project.

NEW YORK — Acme Iron Pipe Co., Inc. has been organized with $10,000 capital to manufacture and deal in iron pipe and fittings. Agents, Apfel & Apfel, 1440 Broadway.

New Jersey

PATERSON, N. J. — Federal Tool & Steel Corp. has been incorporated with 1000 shares of no par value stock. Company agent, Louis Dworetz.

Pennsylvania

EMLENTON, PA. — Borough, Homer Jacobs, secretary of sewage plant authority, is taking bids due 7:30 p. m., Dec. 15, on construction of sewage disposal plant and intercepting sewers costing total of $36,200. Chester Engineers, Pittsburgh, consultants.

OIL CITY, PA. — Continental Can Co., A. V. Crary, vice president, soon takes bids on a one-story 160 x 400-foot can manufacturing plant costing $500,000. Equipment is to include automatic can-making machinery and complete lithographing equipment. Company engineers in charge.

Michigan

DETROIT — Hinde & Dauch Paper Co., Cleveland, will erect soon a modern one-story, steel and concrete factory, 200 x 510 feet, for manufacture of corrugated boxes. Plant scheduled for operation by April 15. Charles U. Harvey is company's Detroit representative.

Illinois

CHICAGO — B. A. Railton Co. has let contract to Enjay Construction Co., 160 North LaSalle street, for a two-story 250 x 250-foot warehouse costing about $775,000. Howard Colburn, Chicago, consulting engineer.

CHICAGO — J. H. Stone & Sons plan installation of motors and controls, conveyors, electric crane, hoists and other equipment in $500,000 corrugated box manufacturing plant to be started soon. A. Epstein, 2001 West Pershing road, architect and engineer.

Indiana

CRAWFORDSVILLE, IND.—City will take bids soon for a 5000-kilowatt turbo-generator unit, accessories, surface condenser and pumping equipment to be installed in municipal electric light and power plant. Commercial Testing & Engineering Co., Chicago, consulting engineer.

EAST CHICAGO, IND. — City has PWA approval of $1,350,000 grant in the construction of a proposed sewage disposal plant to cost about $3,000,000.

Maryland

HAGERSTOWN, MD.—City will probably award contract to Bester & Long, Hagerstown, for reconditioning sludge beds at sewage disposal plant, and will call soon for bids on construction of sludge digestion tanks and gas utilization system. Cost entire project estimated at $85,000. (Noted Sept. 19.)

District of Columbia

WASHINGTON—Navy department, bureau of supplies and accounts, takes bids to Dec. 9 on a wood boring machine (Schedule 4955); pneumatic hammer (Schedule 4958); acetylene cylinders (Schedule 4991); and steel slides (Schedule 5011).

WASHINGTON — Navy department, yards and docks, receives bids for three turbo-alternator units and auxiliary equipment (Specification 9027) for installation in power plant at Pearl Harbor, T. H., naval base.

Kentucky

NORTH MIDDLETOWN, KY. — City, Russell Summary, mayor, has received PWA approval of grant of $33,750 in waterworks and gas improvement projects costing total of $75,000. Will finance balance with bonds.

Georgia

SUMMERVILLE, GA. — PWA has approved grant of $34,000 to city for constructing waterworks improvements costing $77,000. Project involves zeolite softening type treatment plant.

Missouri

CARROLLTON, MO. — PWA has approved allotment to city of $74,000 grant in the construction of a waterworks system to cost $165,000. Project includes distribution mains, elevated storage tank, etc.

COLUMBIA, MO. — Boone County Cooperative Electrical association has REA allotment of $135,000 and will build additional 120 miles rural power transmitting lines in the county. Richard Dinwiddie, association manager.

GLASGOW, MO. — City, T. T. Hall, mayor, carried bond issue at recent election to finance construction of new filter plant costing $16,286. Black & Veatch, Kansas City, Mo., consulting engineers.

KANSAS CITY, MO. — Reade Mfg. Co., Jersey City, N. J., has leased a building here and will establish a plant for manufacture of water softening compounds.

KIRKSVILLE, MO.—REA has approved an allotment of $226,000 to Tri-County Electric Co-operative association for construction of 216 miles of rural power lines in three counties.

RICHLANDS, MO. — City has received PWA grant in the projected construction of a sewerage works including treatment plant, Imhoff tank, trickling filters, sludge beds and costing approximately $27,000.

ST. LOUIS — Johnston Tin Foil & Metal Co. has awarded general contract for construction of a $40,000 one-story 100 x 100-foot addition to its factory to the Woermann Construction Co., 3800 West Pine boulevard. (Noted Oct. 31.)

WESTON, MO. — City, Thomas Hanson, mayor, has completed its plans and will accept bids soon on the installation of a diesel generating unit and distribution system to cost $85,000. E. T. Archer & Co., Kansas City, Mo., consulting engineers.

Wisconsin

MADISON, WIS. — Board of education has let general contract for building $100,000 manual arts addition to East high school to George Nelson & Son, 1117 West Johnson street.

MILWAUKEE — Nunn-Bush Co., 2822 North Fifth street, shoe manufacturer, is about to begin work on a power plant addition to its factory, 50 x 90 feet, costing $50,000. Oscar Kisa, Milwaukee, consulting engineer.

Minnesota

DULUTH — City voted approval of a $900,000 bond issue to supplement PWA grant for construction of a sewage disposal plant costing $1,424,000. Burlingame, Hitchcock & Estabrook, Minneapolis, consulting engineers.

EAST GRAND FORKS, MINN. — City, A. G. Rand, clerk, is taking bids to 8 p.m., Dec. 12, on the projected improvement and alteration of its water treatment plant to cost $41,200. Lium & Burdick, Grand Forks, N. Dak., consulting engineers. Certified check 5 per cent to accompany bid.

FAIRFAX, MINN. — Renville-Sibley Co-operative Power association, A. E. Melvold, secretary, is taking bids to 2 p.m., Dec. 8, for construction of approximately 178 miles of rural transmission lines in two counties. Ellerbe & Co., St. Paul, consulting engineers. Certified check 5 per cent to accompany bids.

LANESBORO, MINN. — Village, A. O. Amdahl, clerk, is taking bids to 2 p.m., Dec. 9, on construction of sanitary street sewers and sewage disposal plant costing $113,000. Toltz, King & Day Inc., St. Paul, engineers. Certified check 5 per cent to accompany bid. (Noted Aug. 29.)

MINNEAPOLIS — Louis F. Jensen Co., 2701 Fourth street, manufacturer of contractors' equipment, has awarded contract to Butler Mfg. Co. for erection of a one-story, 40 x 60-foot steel warehouse and shop building.

NICOLLET, MINN. — PWA has allotted grant to the city in the construction of a waterworks addition including pressure aerator filter with valves, piping and pump house addition. General Filter Co., Ames, Iowa, engineer.

ST. PAUL — Truel Foundry Co., 682 Raymond avenue, has been incorporated to operate a foundry by F. A. Truel, Emil Strom and Fred Peterson.

ST. PAUL — Paper, Calmenson & Co., 975 East Seventh street, steel distributors, have started construction of a one-story, 32 x 144-foot addition to their steel storage warehouse.

STAPLES, MINN. — City, B. C. Barrett, clerk, is taking bids to 2 p.m., Dec. 9, for construction of a reservoir and complete water treatment plant estimated to cost $50,000. P. C. Bettenburg Inc., 1437 Marshall avenue, St. Paul, engineer. Certified check 10 per cent to accompany bid. (Noted Oct. 3.)

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WAZATA, MINN. — Voters have approved $110,000 bond issue to finance construction of a proposed sewage system and disposal plant. E. L. Johnson, city clerk.

Texas

AMARILLO, TEX. — City tentatively closes bids Dec. 8 on extensions to sewer and water distribution systems, including 10,000,000-gallon pumping unit and central water plant. Total cost about $200,000. H. R. Smith, city manager and engineer.

BASTROP, TEX. — PWA has approved loan and grant totaling $58,181 to city in the proposed construction of a distributing system using power purchased from the Lower Colorado river authority.

BLUE GROVE, TEX. — J. A. C. Cooperative association has been allotted $115,000 REA grant for projected construction of 116 miles of rural transmission lines in three counties. Consultants, Isbell Engineers, Jacksboro, Tex.

BURNET, TEX. — City has received $27,000 PWA loan and grant of $22,000 for constructing complete electric distribution system to use Lower Colorado river authority power.

ELGIN, TEX. — City will begin work shortly on plans to build $80,000 distribution system for power from Lower Colorado river authority. Financing by bond issue. Doak Rainey, Austin, Tex., engineer.

EL PASO, TEX. — El Paso Smelting works is constructing an addition to its plant to carry on arsenic collection by filtering vapors.

HENDERSON, TEX. — Rusk County Electric Co-operative Inc., E. L. Hightower, project superintendent, has REA allotment of $125,000, and is making plans to erect an additional 125 miles of rural lines. William G. Morrison, Waco, Tex., consulting engineer.

HIGHLAND PARK, TEX. — Voters, with those of University Park, jointly approved $2,246,000 bond issue to finance construction of projected water storage reservoir, filtration plant and sewerage system.

HOUSTON, TEX. — Southern Acid & Sulphur Co., Texarkana, Tex., has awarded contract for constructing four buildings costing about $125,000 at its proposed plant here to Austin Co., Second National Bank building, Houston.

LAMPASAS, TEX. — PWA approved grant of $34,000 and $42,000 loan to city to enable construction of electric distribution and street lighting system.

SAN AUGUSTINE, TEX. — City, A. E. Rushing, mayor, is taking bids for power plant improvements including installation of 335-kilowatt diesel electric unit. PWA grant of $18,000 allotted and bonds of $25,000 approved by voters. Municipal Engineering & Finance Co., Dallas, Tex., engineer. (Noted Oct. 3.)

Kansas

PAOLA, KANS. — City, A. A. Bryan, mayor, votes Dec. 12 on a $185,000 bond issue to aid in financing construction of a new diesel power plant and distribution system costing $240,000. W. B. Rollins & Co., Kansas City, Mo., consultants. (Noted Nov. 11.)

WINFIELD, KANS. — REA has allotted $231,000 to the Sumner-Cowley Rural Electrification project, Harold Koger, president, to finance construction of 270 miles of rural power transmitting lines in Sumner and Cowley counties.

Iowa

ANITA, IOWA — Voters approved a $110,000 bond issue at recent election to supplement PWA allotment in the construction of a proposed electric light plant and distribution system. Solon Karns, clerk; Young & Stanley Inc., Muscatine, Iowa, engineers. (Noted Oct. 17.)

Montana

HAMILTON, MONT. — United States public health service, Washington, will open bids Dec. 22 for enlargement of laboratory and construction of garages and shops here. Project allotted $622,000.

Nevada

COALDALE, NEV. — O. G. Avery, 51 Atlantic avenue, Long Beach, Calif., plans to construct a sulphur refining plant here to cost about $40,000; will purchase machinery and equipment. George Anderson, care of owner, engineer.

Arizona

TEMPE, ARIZ. — Salt River Valley Water Users' association, Phoenix, Ariz., is taking bids on installation of 60-cycle turbine generator of 3000-kilowatt hour capacity in Cross Cut canal plant; cost estimated at $200,000. H. W. Lawson, Tempe, plant superintendent.

Pacific Coast

LOS ANGELES—Certificate to conduct business under name of General Pipe & Supply Co., 8419 Atlantic boulevard, has been issued to the owner, A. Fishfader, Bakersfield, Calif.

SAN FRANCISCO — J. Harbond has awarded general contract for a one-story industrial plant costing $35,000 exclusive of equipment to W. C. Akard, 225 Cervantes avenue.

HERMISTON, OREG. — Umatilla Electrical Co-operative association has been allotted a $37,000 grant by REA and will construct 33 miles of rural power distributing lines.

PORTLAND, OREG. — Russell Hurlburt has general contract from Maytag Northwest Co. for construction of a $40,000 office and warehouse for repair and parts departments.

SILVERTON, OREG. — City is receiving bids Dec. 5 for furnishing mechanical equipment for sewage treatment. Baar & Cunningham, Portland, Oreg., engineers.

SEATTLE — Industrial Minerals Inc. has been formed with capital of $100,000 by Charles R. Berry and associates, 610 Arctic building.

SEATTLE — Blue Lake Mining Corp., 1221 Vance building, has been incorporated by Frank Williams and associates. Capitalization is $100,000.

SPOKANE — Matchless Consolidated Gold Mining Co., 301 Title building, has filed for incorporation with $100,000 capital. Organizers headed by Joseph F. Hocking.

TOPPENISH, WASH. — National Juice Machinery Co., 401½ Washington avenue, has been incorporated with capital of $50,000 by B. R. Sturm and associates.

Canada

LANGLEY, B. C. — Municipality is making plans for a sewage disposal plant to cost about $30,000. A. E. Foreman, Vancouver, B. C., engineer.

VICTORIA, B. C. — Deep River Development Co. Ltd. plans to construct and equip a rayon pulp mill here at estimated cost of about $350,000.

WATERLOO, ONT. — Canadian Breweries has awarded $125,000 contract to Dunker Construction Co., 250 King street, Kitchener, Ont., for constructing a 101 x 108-foot brewery, including installation of 35 steel storage tanks.

WESTMINSTER, ONT. — Township is making plans for extensions in its sewerage system to cost about $140,000. W. Vitch, city hall, London, Ont., engineer.

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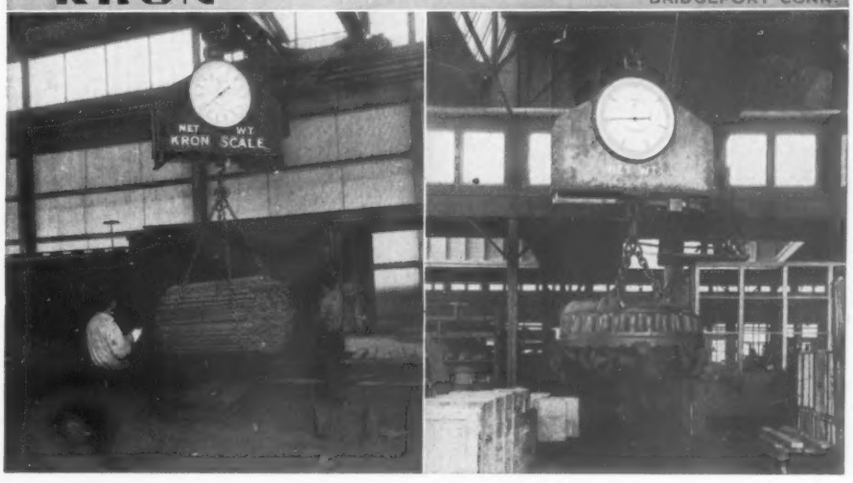

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Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
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*Midvale Co., The, Nicetown, Philadelphia, Pa.
*Republic Steel Corp., Dept. ST, Cleveland, O.
*Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
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Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Auto Beauty vs. Utility

To the Editor:

Mr. Dreyfuss' criticism of current automobile styles, as given in your issue of Nov. 28, I think is quite to the point and should have some beneficial effect on body designers.

It appears to laymen that there is too much art and not enough commonsense, and that body designers should be held in check by some means so they will not ultimately drift into futuristic designs that might render the automobile practically useless as a mobile apparatus.

The average body designer works with the idea of style and beauty foremost. However, he appears to have an extremely low sense of utility, and as a result we have autos with windshield, cowls, hoods, and door windows so high that visibility for the average driver is impaired to the extent that a great number of accidents at street intersections are traceable directly to this fault.

They put curved glass crystals over the instruments because they think they look attractive, but result in high-light reflections that make it difficult to read the instruments. They put the instruments at all cock-eyed angles and then use fancy dials, and pointers which at no time coincide with the dial markings. They even substitute a dot here and there in lieu of the sensible conventional division lines ordinarily used on instruments.

Designers put a bar down the center of the windshield, and then put another in the rear window because it harmonizes, but which is a nuisance when you use the rear view mirror. They make the body so low at the rear your hat touches the roof—but why continue?

There is no good reason why body design and details cannot be made attractive and still retain utility. A case in point that is forced on the designers is the radiator grille. Some designers would like to make close-meshed narrow grilles, or leave them out entirely, but are prevented by the fact that a definite area has to be provided to pass enough air to maintain correct engine temperatures. No such iron clad restrictions apply to body design.

Isn't it possible for body designers to work with an additional thought in mind, namely, utility? When they have worked out the idea of any design, with the idea of style, beauty and harmony, be it the body or any of the details that go with it, why not study the design from the standpoint of utility, for after all these items are made for use and convenience as well as for appearance.

W. H. WINEMAN

Sullivan Machinery Co.,
Michigan City, Ind.

Opposes Incentive Tax

To the Editor:

Profit sharing, as such, is a very laudable step for business to take, but we are extremely doubtful if legislation is the way to go about getting profit sharing in more industries, offering tax credits as an incentive therefor.

It is our opinion that legislation designed to promote profit sharing in industry can only further confuse business and work as a hardship against those industries which are not in a position to share profits.

We are definitely of the opinion that no permanent progress can be made in industrial relations through legislation.

PHILIP M. MORGAN

Assistant to President,
Morgan Construction Co.,
Worcester, Mass.

Machine Makes More Jobs

To the Editor:

I am becoming more and more convinced that the majority of people, educated as well as uneducated, believe that the machine reduces employment.

This seems to come about because in thousands of individual cases it does just that and also because of the prevalence of advertisements for labor-saving devices and machines.

Of course the reverse is known to be true and long articles and books have been written to prove it, but they are not believed or they are forgotten.

This belief leads to much ill-considered legislation and to election of many poorly equipped candidates.

I think it is up to you to help correct this situation, not by long treatises on the subject, but by news items, short editorials, brief statistics, and by persistent effort, for it is vastly important that our voting public be kept correctly informed on this very vital subject.

F. W. JESSOP,

Ohio Electric Mfg. Co.,
5900 Maurice Avenue,
Cleveland.

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